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# RESEARCH MEMORANDUM

TESTS IN THE AMES 40- BY 80-FOOT WIND TUNNEL OF THE  
AERODYNAMIC CHARACTERISTICS OF AIRPLANE  
MODELS WITH PLAIN SPOILER AILERONS

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NATIONAL ADVISORY COMMITTEE  
FOR AERONAUTICS

WASHINGTON

December 6, 1954

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RESEARCH MEMORANDUMTESTS IN THE AMES 40- BY 80-FOOT WIND TUNNEL OF THE  
AERODYNAMIC CHARACTERISTICS OF AIRPLANE  
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## SUMMARY

Four wings of different plan form equipped with plain spoiler ailerons have been tested at low speeds. Three of the models had wings of aspect ratio 3, the taper ratios and sweep of the quarter-chord lines being 0.40 and  $16^{\circ}$ ; 0.40 and  $41^{\circ}$ ; and 0 and  $45^{\circ}$ . The fourth model had a wing of aspect ratio 4.8 with a taper ratio of 0.51 and sweep of  $35^{\circ}$ . The spoilers were mounted normal to the wing upper surface along a constant-percent-chord line and were of constant-percent-chord height. Spoiler heights of 5-, 10-, and 15-percent chord, and spoiler lengths of 5- to 100-percent semispan were tested. The tests were conducted at Reynolds numbers from 7 to 13 million at a Mach number of 0.13. The data obtained are presented without discussion in the form of tabulated, six-component force and moment characteristics. In addition, some of the data are presented in graphic form.

## INTRODUCTION

Retractable spoiler ailerons have been among the devices suggested to assist or replace flap-type ailerons as lateral controls on high-speed aircraft. Because of this interest, research work on spoilers has been carried out in wind-tunnel and flight tests. A bibliography of reports resulting from this research is given in reference 1.

It is the purpose of this report to present data showing the effect of plain spoiler ailerons on the characteristics of wing plan forms not previously tested with spoilers. Four wings of different plan form equipped with spoilers of various heights and spanwise extents were tested. The data presented in this report were obtained for use in developing and evaluating a method of predicting the rolling effectiveness of spoilers which is presented in reference 2. All of the data are

in tabulated form and, in addition, some data showing significant trends are also presented in graphic form.

#### NOTATION

The coefficients and symbols used in this report are defined as follows:

b wing span, measured perpendicular to plane of symmetry, ft

$C_D$  drag coefficient,  $\frac{\text{drag}}{qS}$

$C_l$  rolling-moment coefficient,  $\frac{\text{rolling moment}}{qSb}$

$C_L$  lift coefficient,  $\frac{\text{lift}}{qS}$

$C_m$  pitching-moment coefficient,  $\frac{\text{pitching moment}}{qSc}$

$C_n$  yawing-moment coefficient,  $\frac{\text{yawing moment}}{qSb}$

$C_y$  side-force coefficient,  $\frac{\text{side force}}{qS}$

c wing chord, measured parallel to plane of symmetry, ft

$\bar{c}$  mean aerodynamic chord of wing, measured parallel to plane of

symmetry,  $\frac{\int_0^{b/2} c^2 dy}{\int_0^{b/2} c dy}$ , ft

h height of spoiler above wing surface, measured normal to wing surface, ft

q free-stream dynamic pressure, lb/sq ft

S wing area, sq ft

$x_s$  distance from wing leading edge to spoiler, measured parallel to plane of symmetry, ft

$y$  lateral coordinate perpendicular to plane of symmetry, ft

$y_s$  distance from model center line to edge of spoiler, measured perpendicular to plane of symmetry, ft

$\alpha$  angle of attack of the wing-chord plane with reference to free stream, deg

$\eta_1$  spanwise location of inboard end of spoiler,  $\frac{y_{s\text{inboard}}}{b/2}$

$\eta_0$  spanwise location of outboard end of spoiler,  $\frac{y_{s\text{outboard}}}{b/2}$

#### DESCRIPTION OF MODELS TESTED

The geometric characteristics of the models tested are shown in figures 1 to 4. These figures and table I identify each of the four models by a number which will henceforth be used when referring to that model.

Tables II through V give the airfoil section ordinates for the models. It should be noted that model 2 was tested with each of two airfoil sections, one section being a modification of the basic NACA 64A006 airfoil section. The modification was made in connection with another investigation.

The spoilers used were fabricated of 3/8-inch plywood, and were installed perpendicular to the wing upper surface along the 70-percent-chord line. In addition, for model 2, spoilers were also placed along either the 60- or the 80-percent-chord lines. All of the spoilers were of constant-percent-chord height and were unperforated. Heights of 5-, 10-, and 15-percent chord were tested. A photograph of a typical installation is shown in figure 5. Spoilers were tested on the upper surface of the right wing panel of each model and varied in length from 5- to 100-percent semispan.

## TESTS AND RESULTS

The tests made on the various models and configurations are listed in table VI. Included are tests made with the vertical tail removed from model 2, and tests made with the horizontal tail removed from model 4. These surfaces were removed in order to determine the effect of their presence on the rolling moment. It should be noted that model 2 complete with vertical tail was tested only with the modified leading edge. All of the tests were made at a dynamic pressure of 25 pounds per square foot and at a Mach number of 0.13. The Reynolds number of the various tests is given in table VI. All of the tests were made at zero sideslip with the range of angles of attack for the different models as follows:

|         |                       |
|---------|-----------------------|
| Model 1 | $\alpha$ , -2° to 18° |
| Model 2 | $\alpha$ , -2° to 20° |
| Model 3 | $\alpha$ , -2° to 20° |
| Model 4 | $\alpha$ , -2° to 16° |

The data have been reduced to NACA coefficient form with the moment center taken at 25 percent of the mean aerodynamic chord. The angle of attack, drag, and pitching moment (for the model with a horizontal tail) have been corrected for wind-tunnel-wall effects. The drag and pitching moment have been corrected for support-strut interference. The angle of attack and drag have also been corrected for air-stream inclination. Corrections due to asymmetrical wing loading were considered negligible. None of the data have been corrected for tare loads due to basic model asymmetry, but the incremental change in any characteristic due to spoiler deflection can be obtained by referring to the data tabulated for the model without spoilers.

The data indexed in table VI are tabulated in tables VII to XIII. Six-component force and moment data are presented for all models. In addition to the tabulated data, figures 6 to 9 present plots of the data obtained on the four models both without spoilers and with full-semispan spoilers deflected. These curves are considered typical of the data tabulated since, in general, the aerodynamic characteristics of the partial-semispan spoilers have the same trends as the curves presented.

Ames Aeronautical Laboratory  
National Advisory Committee for Aeronautics  
Moffett Field, Calif., Aug. 26, 1954

REFERENCES

1. Lowry, John G.: Data on Spoiler-Type Ailerons. NACA RM L53I24a, 1953.
2. Franks, Ralph W.: The Application of a Simplified Lifting-Surface Theory to the Prediction of the Rolling Effectiveness of Plain Spoiler Ailerons at Subsonic Speeds. NACA RM A54H26a, 1954.

TABLE I.- DIMENSIONAL DATA OF MODELS 1, 2, 3, AND 4

|   | Model |       |        |        |
|---|-------|-------|--------|--------|
|   | 1     | 2     | 3      | 4      |
| Wing  |       |       |        |        |
| Area, sq ft. . . . .  | 312.5 | 312.5 | 313.76 | 287.58 |
| Span, ft . . . . .  | 30.62 | 30.62 | 30.64  | 37.12  |
| Mean aerodynamic chord, ft .  | 10.83 | 10.83 | 13.65  | 8.09   |
| Aspect ratio . . . . .  | 3.00  | 3.00  | 2.99   | 4.78   |
| Sweep, quarter-chord line,<br>deg. . . . .                              | 15.94 | 40.6  | 45.0   | 35.0   |
| Taper ratio. . . . .  | 0.40  | 0.40  | 0      | 0.51   |
| Twist, deg . . . . .  | 0     | 0     | 0      | 2      |
| Dihedral, deg. . . . .  | 0     | 0     | 0      | 3      |
| Fuselage  |       |       |        |        |
| Length, ft . . . . .  | ---   | 56.16 | 56.16  | 46.00  |
| Maximum diameter, ft . . . .  | ---   | 4.49  | 4.49   | 3.68   |
| Fineness ratio . . . . .  | ---   | 12.50 | 12.50  | 11.55  |
| Vertical tail   |       |       |        |        |
| Exposed area, sq ft. . . . .  | ---   | 52.53 | 52.53  | 15.5   |
| Aspect ratio of plan form<br>extended to model center<br>line . . . . . | ---   | 1.00  | 1.00   | 0.93   |
| Taper ratio. . . . .  | ---   | 0     | 0      | 0.60   |
| Airfoil section thickness,<br>percent chord. . . . .                    | ---   | 5     | 5      | 16     |
| Horizontal tail   |       |       |        |        |
| Area, sq ft. . . . .  | ---   | ---   | ---    | 34.74  |
| Aspect ratio . . . . .  | ---   | ---   | ---    | 4.68   |
| Taper ratio. . . . .  | ---   | ---   | ---    | 0.45   |
| Sweep, quarter chord, deg. .  | ---   | ---   | ---    | 35.00  |
| Dihedral angle, deg. . . . .  | ---   | ---   | ---    | 10.00  |

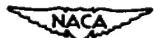


TABLE II.- COORDINATES OF THE AIRFOIL SECTION  
USED FOR MODEL 1 (MODIFIED DIAMOND)

[All coordinates are in percent chord  
and are taken parallel to the model  
center line.]

| Station | Ordinate |
|---------|----------|
| 0       | $a_0$    |
| 43.34   | 1.950    |
| 45.00   | 2.015    |
| 47.50   | 2.079    |
| 50.00   | 2.100    |
| 52.50   | 2.079    |
| 55.00   | 2.015    |
| 56.66   | 1.950    |
| 100.00  | $b_0$    |

<sup>a</sup>Airfoil has straight line between these points.

<sup>b</sup>Airfoil has straight line between these points.



TABLE III.- COORDINATES OF THE AIRFOIL SECTIONS  
USED FOR MODEL 2

[All coordinates are referred to the chord of the NACA 64A006 section and are in terms of percent of that chord. The sections are taken normal to the streamwise 0.31-chord line.]

| Station             | Ordinates of<br>original<br>sections<br>(NACA 64A006) | Ordinates of modified sections |                        |
|---------------------|---|--------------------------------|------------------------|
|                     |   | Upper surface                  | Lower surface          |
| -1.50               |   | -1.380                         | -1.380                 |
| -1.25               |   | -.600                          | -2.065                 |
| -1.00               |   | -.340                          | -2.315                 |
| -.75                |   | -.145                          | -2.490                 |
| -.25                |   | .160                           | -2.750                 |
| .00                 |   | .290                           | -2.855                 |
| .25                 | 0   | .395                           | -2.955                 |
| .50                 | .485  | .490                           | -3.040                 |
| .75                 | .585  | (1)                            | -3.100                 |
| 1.25                | .739  |                                | -3.220                 |
| 2.5                 | 1.016   |                                | -3.405                 |
| 5.0                 | 1.399   |                                | -3.600                 |
| 7.5                 | 1.684   |                                | -3.670                 |
| 10                  | 1.919   |                                | -3.680                 |
| 15                  | 2.283   |                                | -3.610                 |
| 20                  | 2.557   |                                | -3.450                 |
| 25                  | 2.757   |                                | -3.235                 |
| 30                  | 2.896   |                                | -3.095                 |
| 35                  | 2.977   |                                | -3.020                 |
| 40                  | 2.999   |                                | -3.000                 |
| 45                  | 2.945   |                                | (1)                    |
| 50                  | 2.825   |                                |                        |
| 55                  | 2.653   |                                |                        |
| 60                  | 2.438   |                                |                        |
| 65                  | 2.188   |                                |                        |
| 70                  | 1.907   |                                |                        |
| 75                  | 1.602   |                                |                        |
| 80                  | 1.285   |                                |                        |
| 85                  | .967  |                                |                        |
| 90                  | .649  |                                |                        |
| 95                  | .331  |                                |                        |
| 100                 | .013  |                                |                        |
| L. E. radius: 0.246 |   | 1.19                           |                        |
|                     |   | Center of L.E.<br>circle:      | sta -0.31<br>ord -1.33 |

<sup>1</sup>Ordinates identical to those of the NACA 64A006 section.

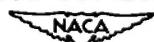


TABLE IV.- COORDINATES OF THE AIRFOIL SECTION USED  
FOR MODEL 3 (NACA 0005-MODIFIED)

[All coordinates are in percent  
chord and are taken parallel to  
the model center line.]

| Station             | Ordinate |
|---------------------|----------|
| 0                   | 0        |
| 1.25                | .789     |
| 2.50                | 1.089    |
| 5.00                | 1.481    |
| 7.50                | 1.750    |
| 10.00               | 1.951    |
| 15.00               | 2.228    |
| 20.00               | 2.391    |
| 25.00               | 2.476    |
| 30.00               | 2.501    |
| 40.00               | 2.419    |
| 50.00               | 2.206    |
| 60.00               | 1.902    |
| 67.00               | 1.650    |
| 70.00               | 1.500    |
| 80.00               | 1.000    |
| 90.00               | 0.500    |
| 100.00              | 0        |
| L. E. radius: 0.275 |          |

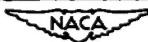


TABLE V.- COORDINATES OF THE AIRFOIL SECTIONS USED FOR MODEL 4  
(NACA 0012-64 MODIFIED AT ROOT; NACA 0011-64 MODIFIED AT TIP)

[All coordinates are in percent chord and  
are taken normal to the 0.25 chord  
stations.]

| Station            | Root station<br>( $2y/b = 0$ )<br>ordinates |        | Tip station<br>( $2y/b = 0.990$ )<br>ordinates |        |
|--------------------|---|--------|--|--------|
|                    | Upper                                       | Lower  | Upper  | Lower  |
| 0                  | 0.573                                       | 0.573  | -0.378   | -0.378 |
| .5                 | 1.659                                       | -.601  | .661   | -.134  |
| .75                | 1.900                                       | -.846  | .875   | -1.559 |
| 1.25               | 2.250                                       | -1.224 | 1.196  | -1.880 |
| 2.5                | 2.855                                       | -1.867 | 1.768  | -2.405 |
| 5.0                | 3.588                                       | -2.706 | 2.491  | -3.062 |
| 7.5                | 4.062                                       | -3.294 | 3.000  | -3.500 |
| 10.0               | 4.415                                       | -3.756 | 3.396  | -3.825 |
| 15.0               | 4.902                                       | -4.466 | 3.989  | -4.273 |
| 20.0               | 5.208                                       | -4.984 | 4.441  | -4.577 |
| 25.0               | 5.401                                       | -5.417 | 4.780  | -4.771 |
| 30.0               | 5.496                                       | -5.732 | 5.041  | -4.878 |
| 35.0               | 5.506                                       | -5.971 | 5.221  | -4.911 |
| 40.0               | 5.438                                       | -6.129 | 5.339  | -4.875 |
| 45.0               | 5.282                                       | -6.198 | 5.371  | -4.766 |
| 50.0               | 5.046                                       | -6.185 | 5.337  | -4.589 |
| 55.0               | 4.719                                       | -6.092 | 5.223  | -4.336 |
| 60.0               | 4.326                                       | -5.919 | 5.043  | -4.003 |
| 65.0               | 3.850                                       | -5.665 | 4.796  | -3.607 |
| 70.0               | 3.293                                       | -5.335 | 4.478  | -3.145 |
| 75.0               | 2.660                                       | -4.933 | 4.100  | -2.614 |
| <sup>a</sup> 80.0  | 1.952                                       | -4.456 | 3.654  | -2.011 |
| <sup>a</sup> 100.0 | -1.719                                      | -1.719 | 1.125  | 1.125  |
| L. E. radius:      |   | 1.527  | 1.236  |        |

<sup>a</sup>Airfoil has straight lines between these points.

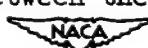


TABLE VI.- SUMMARY OF CONFIGURATIONS TESTED

| Model | Configuration<br>(1) | $x_s/c$ | $h/c$ | $\eta_1$ | $\eta_0$ | Reynolds<br>number | Figure | Table |
|-------|----------------------|---------|-------|----------|----------|--------------------|--------|-------|
| 1     | W                    | 0.70    | 0     | 0        | 0.2      | $9.7 \times 10^6$  | 6      | VII   |
|       |                      |         | .05   | 0        | .4       |                    |        |       |
|       |                      |         |       | 0        | .6       |                    |        |       |
|       |                      |         |       | 0        | .8       |                    |        |       |
|       |                      |         |       | 0        | 1.0      |                    |        |       |
|       |                      |         |       | .4       | 1.0      |                    |        |       |
|       |                      |         |       | .6       | 1.0      |                    |        |       |
|       |                      |         |       | .10      | 0        |                    |        |       |
|       |                      |         |       |          | .2       |                    |        |       |
|       |                      |         |       |          | .4       |                    |        |       |
|       |                      |         |       |          | .6       |                    |        |       |
|       |                      |         |       |          | .8       |                    |        |       |
|       |                      |         |       |          | 0        |                    |        |       |
|       |                      |         |       |          | 1.0      |                    |        |       |
|       |                      |         |       |          | .2       |                    |        |       |
|       |                      |         |       |          | .4       |                    |        |       |
| 2     | W+F                  | .70     | 0     | 0        | 1.0      | $9.7 \times 10^6$  | 6      | VIII  |
|       |                      |         | .05   | .15      | .2       |                    |        |       |
|       |                      |         |       | .15      | .4       |                    |        |       |
|       |                      |         |       | .15      | .6       |                    |        |       |
|       |                      |         |       | .15      | .8       |                    |        |       |
|       |                      |         |       | .15      | 1.0      |                    |        |       |
|       |                      |         |       | .20      | 1.0      |                    |        |       |
|       |                      |         |       | .4       | 1.0      |                    |        |       |
|       |                      |         |       | .6       | 1.0      |                    |        |       |
|       |                      |         |       | .8       | 1.0      |                    |        |       |
|       |                      |         |       | .2       | .6       |                    |        |       |
|       |                      |         |       | .15      | .2       |                    |        |       |
|       |                      |         |       | .15      | .4       |                    |        |       |
|       |                      |         |       | .15      | .6       |                    |        |       |
|       |                      |         |       | .15      | .8       |                    |        |       |
|       |                      |         |       | .15      | 1.0      |                    |        |       |
|       |                      |         |       | .2       | 1.0      |                    |        |       |
|       |                      |         |       | .4       | 1.0      |                    |        |       |
|       |                      |         |       | .6       | 1.0      |                    |        |       |
|       |                      |         |       | .8       | 1.0      |                    |        |       |
|       |                      |         |       | .2       | .6       |                    |        |       |
|       |                      |         |       | .4       | .6       |                    |        |       |

Configuration designations: W, wing; F, fuselage; V, vertical tail; H, horizontal tail; W<sub>mod</sub>, modified wing.



TABLE VI.- SUMMARY OF CONFIGURATIONS TESTED - Continued

| Model | Configuration<br>( $z$ ) | $x_s/c$ | $h/c$ | $\eta_1$  | $\eta_0$   | Reynolds<br>number | Figure | Table |
|-------|--------------------------|---------|-------|---|--|--------------------|--------|-------|
| 2     | W+F                      | 0.70    | 0.15  | 0.15<br>.15<br>.15<br>.15<br>.15<br>.2<br>.4<br>.6<br>.8    | 0.2<br>.4<br>.6<br>.8<br>1.0<br>1.0<br>1.0<br>1.0<br>1.0 | $9.7 \times 10^6$  | ---    | VIII  |
|       | W <sub>mod</sub> +F+V    | 0       |       | .2  | .6   |                    | ---    |       |
|       |                          | .70     | .10   | .15   | 1.0  |                    | ---    | IX    |
|       | W <sub>mod</sub> +F      | 0       |       | ---   | ---  |                    | ---    | X(a)  |
|       |                          | .70     | .05   | .15<br>.15<br>.15<br>.15<br>.15<br>.15<br>.15<br>.15<br>.15 | .4<br>1.0<br>1.0<br>.4<br>1.0<br>.4<br>1.0<br>.4<br>1.0  |                    | ---    |       |
|       |                          |         |       | .60   | .6   |                    | ---    |       |
|       |                          |         |       | .6  | 1.0  |                    | ---    |       |
|       |                          |         |       | .15   | .4   |                    | ---    |       |
|       |                          |         |       | .15   | .6   |                    | ---    |       |
|       |                          |         |       | .15   | .8   |                    | ---    |       |
|       |                          |         |       | .15   | 1.0  |                    | ---    |       |
|       |                          |         |       | .4  | 1.0  |                    | ---    |       |
|       |                          |         |       | .6  | 1.0  |                    | ---    |       |
|       |                          |         |       | .15   | .4   |                    | ---    |       |
|       |                          |         |       | .15   | .6   |                    | ---    |       |
|       |                          |         |       | .15   | 1.0  |                    | ---    |       |
|       |                          |         |       | .4  | 1.0  |                    | ---    |       |
|       |                          |         |       | .6  | 1.0  |                    | ---    |       |
|       |                          |         |       | .8  | 1.0  |                    | ---    |       |
|       | W+F+V                    | 0       |       | ---   | ---  | $12.8 \times 10^6$ | 8      | XI    |
| 3     |                          | .70     | .05   | .15<br>.15<br>.15<br>.15<br>.15<br>.2<br>.4<br>.6<br>.8     | .2<br>.4<br>.6<br>.8<br>1.0<br>1.0<br>1.0<br>1.0         |                    | ---    |       |
|       |                          |         |       | .2  | 1.0  |                    | 8      |       |
|       |                          |         |       | .4  | 1.0  |                    | ---    |       |
|       |                          |         |       | .6  | 1.0  |                    | ---    |       |
|       |                          |         |       | .8  | 1.0  |                    | ---    |       |
|       |                          |         |       | .2  | .4   |                    | ---    |       |
|       |                          |         |       | .4  | .6   |                    | ---    |       |
|       |                          |         |       | .4  | .8   |                    | ---    |       |

<sup>2</sup>See footnote 1, p. 11.

TABLE VI. - SUMMARY OF CONFIGURATIONS TESTED - Concluded

<sup>8</sup>See footnote 1, p. 11.

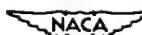


TABLE VII.- AERODYNAMIC CHARACTERISTICS OF MODEL 1  
(a)  $x_s/c = 0.70$ ;  $h/c = 0$  and  $0.05$

| $\alpha$  | $C_L$  | $C_D$  | $C_m$  | $C_Y$   | $C_l$  | $C_n$  |
|-----------|--------|--------|--------|---------|--------|--------|
| $h/c = 0$ |        |        |        |         |        |        |
| -2.03     | -0.106 | 0.0097 | 0.0073 | -0.0001 | 0.0007 | 0.0003 |
| .05       | .008   | .0075  | .0082  | 0       | .0006  | .0001  |
| 2.13      | .128   | .0116  | .0158  | -.0004  | .0012  | .0003  |
| 4.21      | .246   | .0234  | .0164  | -.0001  | .0012  | .0003  |
| 6.30      | .372   | .0441  | .0172  | -.0003  | .0005  | .0002  |
| 8.40      | .511   | .0773  | .0049  | .0004   | .0002  | .0003  |
| 10.49     | .643   | .1205  | -.0117 | .0008   | -.0004 | .0002  |
| 12.56     | .748   | .1706  | -.0430 | .0019   | -.0018 | .0001  |
| 14.61     | .819   | .2186  | -.0642 | .0031   | -.0001 | -.0003 |
| 16.59     | .786   | .2501  | -.0997 | .0023   | -.0020 | -.0003 |
| 18.50     | .655   | .2366  | -.0982 | .0026   | .0017  | -.0016 |

| $\alpha$     | $C_L$  | $C_D$  | $C_m$   | $C_Y$        | $C_l$   | $C_n$           | $\alpha$ | $C_L$  | $C_D$  | $C_m$   | $C_Y$  | $C_l$           | $C_n$           |
|--------------|--------|--------|---------|--------------|---------|-----------------|----------|--------|--------|---------|--------|-----------------|-----------------|
| $h/c = 0.05$ |        |        |         |              |         |                 |          |        |        |         |        |                 |                 |
|              |        |        |         | $\eta_1 = 0$ |         | $\eta_0 = 0.20$ |          |        |        |         |        | $\eta_1 = 0$    | $\eta_0 = 0.40$ |
| -2.03        | -0.095 | 0.0163 | -0.0060 | 0.0012       | -0.0004 | -0.0002         | -2.06    | -0.140 | 0.0240 | -0.0096 | 0.0014 | 0.0013          | 0.0005          |
| .05          | .013   | .0145  | -.0038  | .0010        | .0002   | -.0002          | .02      | -.022  | .0209  | -.0042  | .0013  | .0016           | .0005           |
| 2.12         | .119   | .0184  | -.0017  | .0005        | .0008   | -.0002          | 2.10     | .082   | .0236  | -.0035  | .0014  | .0029           | .0003           |
| 4.21         | .238   | .0303  | .0044   | .0003        | .0012   | 0               | 4.18     | .195   | .0334  | .0016   | .0013  | .0039           | .0001           |
| 6.30         | .366   | .0510  | .0035   | -.0001       | .0019   | .0001           | 6.27     | .331   | .0536  | .0031   | .0010  | .0026           | .0002           |
| 8.39         | .502   | .0835  | -.0078  | -.0004       | .0011   | .0001           | 8.36     | .462   | .0839  | -.0075  | .0009  | .0030           | 0               |
| 10.47        | .624   | .1251  | -.0247  | .0004        | .0015   | -.0002          | 10.46    | .596   | .1245  | -.0174  | .0016  | .0031           | 0               |
| 12.55        | .735   | .1750  | -.0462  | .0008        | .0012   | -.0003          | 12.53    | .702   | .1720  | -.0470  | .0010  | .0040           | -.0005          |
| 14.59        | .786   | .2149  | -.0716  | .0009        | .0038   | -.0012          | 14.59    | .789   | .2188  | -.0717  | .0006  | .0036           | -.0004          |
| 16.59        | .788   | .2514  | -.0940  | .0020        | -.0008  | -.0004          | 16.60    | .805   | .2490  | -.0846  | .0014  | -.0004          | -.0005          |
| 18.55        | .738   | .2669  | -.1137  | .0013        | -.0010  | -.0001          | 18.52    | .696   | .2473  | -.0980  | .0023  | .0004           | -.0016          |
| $h/c = 0.05$ |        |        |         |              |         |                 |          |        |        |         |        |                 |                 |
|              |        |        |         | $\eta_1 = 0$ |         | $\eta_0 = 0.60$ |          |        |        |         |        | $\eta_1 = 0$    | $\eta_0 = 0.80$ |
| -2.08        | -0.168 | 0.0306 | -0.0057 | 0.0012       | 0.0055  | 0.0022          | -2.10    | -0.195 | 0.0362 | -.0043  | 0.0015 | 0.0102          | 0.0037          |
| 0            | -.061  | .0263  | .0025   | .0012        | .0058   | .0019           | -.02     | -.081  | .0308  | .0015   | .0012  | .0113           | .0034           |
| 2.07         | .046   | .0275  | .0018   | .0009        | .0070   | .0015           | 2.06     | .023   | .0312  | .0037   | .0008  | .0019           | .0028           |
| 4.15         | .157   | .0359  | .0051   | .0010        | .0078   | .0010           | 4.13     | .132   | .0382  | .0069   | .0006  | .0131           | .0022           |
| 6.25         | .304   | .0550  | .0046   | .0009        | .0051   | .0010           | 6.23     | .276   | .0552  | .0067   | .0005  | .0098           | .0016           |
| 8.36         | .459   | .0867  | -.0067  | .0007        | .0049   | .0005           | 8.35     | .445   | .0852  | -.0057  | .0004  | .0062           | .0009           |
| 10.45        | .582   | .1238  | -.0196  | .0012        | .0061   | -.0003          | 10.44    | .581   | .1232  | -.0198  | .0004  | .0060           | -.0001          |
| 12.53        | .708   | .1722  | -.0476  | .0001        | .0060   | -.0005          | 12.53    | .702   | .1711  | -.0471  | .0010  | .0045           | -.0011          |
| 14.59        | .783   | .2111  | -.0620  | .0003        | .0052   | -.0009          | 14.59    | .790   | .2143  | -.0649  | .0006  | .0045           | -.0012          |
| 16.59        | .780   | .2458  | -.0945  | .0006        | .0019   | -.0004          | 16.59    | .793   | .2442  | -.0896  | .0004  | .0047           | -.0010          |
| 18.52        | .685   | .2460  | -.1000  | .0017        | .0004   | -.0014          | 18.53    | .701   | .2464  | -.0933  | .0008  | .0013           | -.0012          |
| $h/c = 0.05$ |        |        |         |              |         |                 |          |        |        |         |        |                 |                 |
|              |        |        |         | $\eta_1 = 0$ |         | $\eta_0 = 1.0$  |          |        |        |         |        | $\eta_1 = 0.40$ | $\eta_0 = 1.0$  |
| -2.10        | -0.202 | 0.0407 | -0.0009 | 0.0025       | 0.0147  | 0.0052          | -2.07    | -0.154 | 0.0258 | 0.0020  | 0.0009 | 0.0073          | 0.0046          |
| -.02         | -.087  | .0348  | .0057   | .0017        | .0144   | .0048           | .01      | -.044  | .0213  | .0070   | .0007  | .0097           | .0042           |
| 2.05         | .017   | .0345  | .0087   | .0009        | .0150   | .0041           | 2.09     | -.070  | .0232  | .0126   | -.0003 | .0109           | .0038           |
| 4.12         | .119   | .0413  | .0123   | .0005        | .0175   | .0034           | 4.17     | .189   | .0322  | .0155   | -.0005 | .0111           | .0030           |
| 6.23         | .269   | .0574  | .0083   | -.0001       | .0142   | .0023           | 6.28     | .351   | .0510  | .0100   | -.0004 | .0059           | .0021           |
| 8.35         | .446   | .0867  | -.0063  | .0006        | .0063   | .0010           | 8.40     | .511   | .0821  | .0006   | -.0007 | .0005           | .0016           |
| 10.45        | .594   | .1262  | -.0208  | .0004        | .0063   | -.0002          | 10.48    | .629   | .1188  | -.0123  | .0009  | .0008           | .0002           |
| 12.54        | .725   | .1741  | -.0592  | .0012        | .0049   | -.0017          | 12.55    | .735   | .1684  | -.0452  | .0013  | .0007           | .0009           |
| 14.59        | .787   | .2129  | -.0660  | .0013        | .0034   | -.0021          | 14.61    | .814   | .2154  | -.0678  | .0016  | -.0005          | -.0011          |
| 16.59        | .793   | .2448  | -.0850  | .0018        | -.0013  | -.0017          | 16.60    | .809   | .2514  | -.0909  | .0017  | -.0044          | -.0006          |
| 18.52        | .695   | .2480  | -.1003  | .0032        | -.0016  | -.0022          | 18.49    | .652   | .2357  | -.0974  | .0010  | -.0020          | 0               |

NACA

TABLE VII.- AERODYNAMIC CHARACTERISTICS OF MODEL 1 - Continued  
(b)  $x_s/c = 0.70$ ;  $h/c = 0.05$  and  $0.10$

| $\alpha$                                     | $c_L$  | $c_D$  | $c_m$   | $c_Y$  | $c_l$  | $c_n$  |  | $\alpha$ | $c_L$  | $c_D$  | $c_m$   | $c_Y$  | $c_l$  | $c_n$  |  |
|--|--------|--------|---------|--------|--------|--------|--|----------|--------|--------|---------|--------|--------|--------|--|
| $h/c = 0.05$ $\eta_1 = 0.60$ $\eta_0 = 1.00$ |        |        |         |        |        |        |  |          |        |        |         |        |        |        |  |
| -2.05  | -0.135 | 0.0188 | 0.0043  | 0.0010 | 0.0046 | 0.0032 |  | -2.08    | -0.154 | 0.0269 | -0.0069 | 0.0005 | 0.0035 | 0.0002 |  |
| .03  | -0.012 | 0.0159 | .0089   | .0008  | .0046  | .0029  |  | 0        | -.038  | .0224  | -.0028  | .0010  | .0038  | -.0001 |  |
| 2.11   | .095   | 0.0183 | .0123   | -.0003 | .0071  | .0026  |  | 2.08     | .091   | .0248  | .0061   | .0005  | .0032  | .0003  |  |
| 4.19   | .213   | .0291  | .0135   | .0004  | .0075  | .0021  |  | 4.15     | .182   | .0346  | .0048   | .0003  | .0053  | .0001  |  |
| 6.29   | .366   | .0486  | .0117   | -.0006 | .0011  | .0017  |  | 6.24     | .304   | .0529  | .0044   | .0008  | .0029  | -.0002 |  |
| 8.39   | .502   | .0796  | .0028   | -.0006 | .0009  | .0011  |  | 8.34     | .448   | .0839  | -.0013  | .0011  | .0039  | -.0004 |  |
| 10.48  | .633   | .1205  | -.0168  | .0008  | .0010  | .0002  |  | 10.42    | .573   | .1223  | -.0116  | .0028  | .0039  | -.0011 |  |
| 12.56  | .742   | .1667  | -.0377  | .0019  | .0012  | -.0010 |  | 12.51    | .691   | .1739  | -.0423  | .0034  | .0037  | -.0010 |  |
| 14.60  | .800   | .2154  | -.0716  | .0012  | .0048  | -.0013 |  | 14.56    | .765   | .2166  | -.0714  | .0033  | .0115  | -.0029 |  |
| 16.60  | .800   | .2487  | -.0927  | .0018  | -.0001 | -.0009 |  | 16.59    | .790   | .2534  | -.0927  | .0033  | .0014  | -.0008 |  |
| 18.52  | .688   | .2503  | -.1079  | .0030  | .0010  | -.0016 |  | 18.55    | .727   | .2603  | -.1068  | .0023  | .0040  | -.0013 |  |
| $h/c = 0.10$ $\eta_1 = 0$ $\eta_0 = 0.40$    |        |        |         |        |        |        |  |          |        |        |         |        |        |        |  |
| -2.12  | -0.205 | 0.0406 | -0.0104 | 0.0017 | 0.0082 | 0.0018 |  | -2.15    | -0.245 | 0.0545 | -0.0022 | 0.0010 | 0.0154 | 0.0047 |  |
| -.04   | -.097  | .0349  | -.0039  | .0016  | .0090  | .0014  |  | -.08     | -.143  | .0469  | .0012   | .0016  | .0153  | .0038  |  |
| 2.04   | .030   | 0.0363 | .0032   | .0010  | .0090  | .0015  |  | 2.00     | -.023  | .0469  | .0078   | .0008  | .0167  | .0036  |  |
| 4.11   | .124   | .0427  | .0051   | .0014  | .0101  | .0009  |  | 4.08     | .072   | .0500  | .0127   | .0013  | .0174  | .0027  |  |
| 6.20   | .247   | .0591  | .0059   | .0005  | .0085  | .0009  |  | 6.15     | .179   | .0620  | .0067   | .0007  | .0154  | .0019  |  |
| 8.30   | .391   | .0882  | -.0033  | .0012  | .0081  | .0005  |  | 8.27     | .359   | .0921  | -.0025  | .0017  | .0144  | .0013  |  |
| 10.39  | .531   | .1269  | -.0118  | .0006  | .0066  | .0007  |  | 10.37    | .502   | .1289  | -.0130  | .0010  | .0091  | .0015  |  |
| 12.48  | .640   | .1741  | -.0390  | .0031  | .0086  | .0008  |  | 12.47    | .634   | .1753  | -.0470  | .0042  | .0096  | -.0011 |  |
| 14.56  | .762   | .2169  | -.0701  | .0038  | .0060  | -.0016 |  | 14.55    | .743   | .2119  | -.0646  | .0045  | .0142  | -.0039 |  |
| 16.56  | .753   | .2434  | -.0946  | .0039  | .0049  | -.0024 |  | 16.59    | .789   | .2456  | -.0849  | .0040  | .0051  | -.0027 |  |
| 18.56  | .730   | .2586  | -.1093  | .0036  | .0040  | -.0034 |  | 18.54    | .711   | .2491  | -.1051  | .0040  | .0019  | -.0041 |  |
| $h/c = 0.10$ $\eta_1 = 0$ $\eta_0 = 0.80$    |        |        |         |        |        |        |  |          |        |        |         |        |        |        |  |
| -2.17  | -0.272 | 0.0661 | 0.0023  | 0.0015 | 0.0238 | 0.0081 |  | -2.18    | -0.308 | 0.0755 | 0.0058  | 0.0024 | 0.0301 | 0.0117 |  |
| -.10   | -.184  | .0570  | .0045   | .0019  | .0235  | .0068  |  | -.09     | -.192  | .0664  | .0023   | .0021  | .0306  | .0107  |  |
| 1.97   | -.065  | 0.0553 | .0129   | .0008  | .0266  | .0063  |  | 1.97     | -.096  | .0627  | .0169   | .0016  | .0311  | .0092  |  |
| 4.04   | .027   | .0567  | .0167   | .0003  | .0264  | .0052  |  | 4.04     | .003   | .0635  | .0204   | .0004  | .0336  | .0075  |  |
| 6.14   | .162   | .0684  | .0135   | .0003  | .0242  | .0039  |  | 6.13     | .130   | .0721  | .0229   | .0004  | .0312  | .0055  |  |
| 8.27   | .348   | .0928  | .0001   | .0003  | .0154  | .0028  |  | 8.27     | .330   | .0927  | .0043   | .0003  | .0185  | .0031  |  |
| 10.37  | .499   | .1270  | -.0100  | .0003  | .0110  | .0012  |  | 10.38    | .486   | .1283  | -.0167  | .0003  | .0139  | .0008  |  |
| 12.47  | .633   | .1747  | -.0430  | .0032  | .0099  | -.0009 |  | 12.48    | .630   | .1709  | -.0356  | .0030  | .0101  | -.0013 |  |
| 14.54  | .731   | .2114  | -.0698  | .0058  | .0101  | -.0044 |  | 14.55    | .738   | .2112  | -.0606  | .0035  | .0080  | -.0037 |  |
| 16.60  | .799   | .2495  | -.0863  | .0046  | .0055  | -.0041 |  | 16.57    | .766   | .2371  | -.0789  | .0028  | -.0001 | -.0030 |  |
| 18.55  | .725   | .2468  | -.0935  | .0049  | .0002  | -.0044 |  | 18.54    | .721   | .2533  | -.0985  | .0021  | -.0002 | -.0027 |  |
| $h/c = 0.10$ $\eta_1 = 0.20$ $\eta_0 = 1.00$ |        |        |         |        |        |        |  |          |        |        |         |        |        |        |  |
| -2.14  | -0.255 | 0.0598 | 0.0061  | 0.0012 | 0.0261 | 0.0120 |  | -2.10    | -0.206 | 0.0434 | 0.0116  | 0.0006 | 0.0212 | 0.0101 |  |
| -.06   | -.147  | .0515  | .0162   | .0006  | .0281  | .0109  |  | -.03     | -.102  | .0371  | .0163   | .0006  | .0225  | .0090  |  |
| 2.01   | -.044  | .0490  | .0180   | 0      | .0283  | .0095  |  | 2.04     | .006   | .0361  | .0205   | -.0006 | .0232  | .0079  |  |
| 4.08   | .058   | .0529  | .0224   | -.0010 | .0311  | .0082  |  | 4.12     | .115   | .0426  | .0247   | -.0012 | .0262  | .0067  |  |
| 6.18   | .204   | .0637  | .0202   | -.0005 | .0286  | .0058  |  | 6.24     | .286   | .0577  | .0217   | -.0013 | .0208  | .0046  |  |
| 8.33   | .417   | .0869  | .0024   | -.0009 | .0164  | .0033  |  | 8.36     | .453   | .0840  | .0013   | -.0008 | .0109  | .0032  |  |
| 10.46  | .589   | .1231  | -.0145  | .0003  | .0102  | .0010  |  | 10.47    | .613   | .1244  | -.0173  | .0003  | .0053  | .0019  |  |
| 12.54  | .716   | .1666  | -.0357  | -.0004 | .0070  | -.0011 |  | 12.55    | .727   | .1562  | -.0349  | .0008  | -.0005 | .0006  |  |
| 14.59  | .791   | .2113  | -.0649  | .0010  | -.0002 | -.0018 |  | 14.61    | .824   | .2130  | -.0597  | .0017  | .0025  | -.0028 |  |
| 16.61  | .816   | .2433  | -.0831  | .0039  | -.0016 | -.0036 |  | 16.59    | .797   | .2470  | -.1004  | .0018  | -.0028 | -.0023 |  |
| 18.52  | .695   | .2462  | -.1041  | .0008  | -.0001 | -.0029 |  | 18.48    | .639   | .2304  | -.0985  | .0003  | .0013  | -.0009 |  |
| $h/c = 0.10$ $\eta_1 = 0.40$ $\eta_0 = 1.00$ |        |        |         |        |        |        |  |          |        |        |         |        |        |        |  |

NACA

TABLE VII.- AERODYNAMIC CHARACTERISTICS OF MODEL 1 - Concluded  
 (c)  $x_a/c = 0.70$ ;  $h/c = 0.10$  and  $0.15$

| $\alpha$       | $C_L$            | $C_D$           | $C_m$            | $C_Y$            | $C_l$            | $C_n$            | $\alpha$       | $C_L$          | $C_D$           | $C_m$            | $C_Y$            | $C_l$            | $C_n$           |                |
|----------------|------------------|-----------------|------------------|------------------|------------------|------------------|----------------|----------------|-----------------|------------------|------------------|------------------|-----------------|----------------|
| $h/c = 0.10$   |                  |                 |                  | $\eta_1 = 0.60$  | $\eta_0 = 1.00$  |                  | $h/c = 0.10$   |                |                 |                  | $\eta_1 = 0.80$  | $\eta_0 = 1.00$  |                 |                |
| -2.08<br>0     | -0.170<br>-0.052 | 0.0301<br>.0251 | 0.0090<br>.0161  | 0.0013<br>.0006  | 0.0125<br>.0135  | 0.0069<br>.0064  | -2.05<br>.03   | -0.132<br>.016 | 0.0185<br>.0154 | 0.0093<br>.0108  | 0.0013<br>.0008  | 0.0048<br>.0058  | 0.0033<br>.0031 |                |
| 2.08<br>4.16   | .057<br>.168     | .0264<br>.0345  | .0167<br>.0217   | 0<br>-.0004      | .0147<br>.0171   | .0056<br>.0047   | 2.11<br>4.19   | .096<br>.216   | .0183<br>.0286  | .0147<br>.0180   | 0<br>0           | .0003<br>.0003   | .0064<br>.0071  | .0029<br>.0022 |
| 6.27<br>8.37   | .324<br>.472     | .0522<br>.0830  | .0181<br>.0030   | -.0014<br>-.0010 | .0118<br>.0081   | .0035<br>.0030   | 6.29<br>8.38   | .352<br>.487   | .0484<br>.0813  | .0154<br>.0050   | -.0009<br>-.0010 | .0045<br>.0031   | .0022<br>.0026  |                |
| 10.46<br>12.55 | .605<br>.734     | .1237<br>.1704  | -.0182<br>-.0427 | .0001<br>.0012   | .0039<br>-.0011  | .0021<br>.0010   | 10.47<br>12.55 | .617<br>.732   | .1223<br>.1698  | -.0122<br>-.0373 | .0001<br>.0012   | .0017<br>.0007   | .0022<br>.0008  |                |
| 14.60<br>16.61 | .807<br>.818     | .2167<br>.2535  | -.0692<br>-.0907 | .0035<br>.0018   | -.0028<br>-.0035 | -.0014<br>-.0007 | 14.59<br>16.61 | .797<br>.813   | .2178<br>.2524  | -.0704<br>.0902  | .0022<br>-.0003  | -.0034<br>-.0009 | .0001<br>.0004  |                |
| 18.49          | .645             | .2319           | -.0942           | .0005            | -.0001           | 0                | 18.48          | .627           | .2300           | -.0987           | .0004            | -.0006           | .0002           |                |
| $h/c = 0.10$   |                  |                 |                  | $\eta_1 = 0.40$  | $\eta_0 = 0.80$  |                  | $h/c = 0.15$   |                |                 |                  | $\eta_1 = 0$     | $\eta_0 = 1.00$  |                 |                |
| -2.09<br>-.01  | -0.188<br>-.076  | 0.0340<br>.0291 | 0.0071<br>.0128  | 0.0004<br>0      | 0.0140<br>.0142  | 0.0063<br>.0057  | -2.23<br>.16   | -0.393<br>.288 | 0.1125<br>.1003 | 0.0134<br>.0181  | 0.0005<br>.0010  | 0.0407<br>.0408  | 0.0193<br>.0173 |                |
| 2.06<br>4.14   | .030<br>.147     | .0298<br>.0370  | .0127<br>.0181   | -.0005<br>-.0006 | .0160<br>.0179   | .0052<br>.0040   | 1.91<br>3.98   | -.186<br>-.091 | .0907<br>.0910  | .0219<br>.0251   | .0003<br>.0009   | .0147<br>.0146   | .0158<br>.0138  |                |
| 6.25<br>8.38   | .301<br>.482     | .0533<br>.0811  | .0119<br>-.0007  | -.0009<br>-.0001 | .0124<br>.0050   | .0032<br>.0013   | 6.06<br>8.17   | .027<br>.187   | .0957<br>.1044  | .0274<br>.0252   | -.0009<br>-.0013 | .0112<br>.0101   | .0138<br>.0079  |                |
| 10.48<br>12.58 | .628<br>.780     | .1201<br>.1663  | -.0179<br>-.0411 | .0005<br>.0012   | .0021<br>.0015   | -.0003<br>-.0015 | 10.32<br>12.43 | .396<br>.554   | .1276<br>.1676  | -.0021<br>-.0309 | .0005<br>.0015   | .0265<br>.0179   | .0026<br>-.0002 |                |
| 14.61<br>16.59 | .818<br>.788     | .2120<br>.2438  | -.0598<br>-.0956 | .0021<br>.0021   | .0005<br>.0013   | -.0025<br>-.0027 | 14.50<br>16.57 | .666<br>.756   | .2166<br>.2534  | -.0729<br>-.0729 | .0014<br>.0018   | .0105<br>.0017   | .0007<br>-.0015 |                |
| 18.49          | .646             | .2324           | -.0985           | .0013            | .0006            | -.0016           | 18.58          | .778           | .2724           | -.0908           | .0038            | .0014            | -.0048          |                |



TABLE VIII.-- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED  
(a)  $x_s/c = 0.70$ ;  $h/c = 0$  and  $0.05$

| $\alpha$        | $c_L$  | $c_D$  | $c_m$   | $c_Y$   | $c_l$   | $c_n$   |
|-----------------|--------|--------|---------|---------|---------|---------|
| $h/c = 0$       |        |        |         |         |         |         |
| -2.04           | -0.110 | 0.0129 | 0.0105  | -0.0001 | -0.0009 | 0.0003  |
| .04             | .005   | .0111  | .0104   | -0.0004 | -0.0004 | -0.0001 |
| 2.12            | .113   | .0133  | .0098   | -0.0004 | -0.0003 | -0.0002 |
| 4.20            | .226   | .0181  | .0061   | -0.0004 | -0.0006 | -0.0002 |
| 6.28            | .346   | .0267  | .0029   | -0.0006 | -0.0005 | -0.0001 |
| 8.37            | .468   | .0443  | -.0078  | .0022   | .0010   | -0.0027 |
| 10.46           | .607   | .0866  | -.0150  | .0026   | -.0024  | -0.0004 |
| 12.54           | .716   | .1414  | -.0049  | .0030   | -.0021  | -0.0004 |
| 14.63           | .805   | .1954  | -.0094  | .0018   | -.0036  | 0.0006  |
| 16.66           | .887   | .2534  | -.0051  | .0020   | -.0027  | -0.0005 |
| 18.69           | .930   | .3103  | -.0119  | .0005   | .0001   | -0.0014 |
| 20.71           | .961   | .3659  | -.0371  | -.0001  | -.0026  | 0.0006  |
| $h/c = 0.05$    |        |        |         |         |         |         |
| $\eta_1 = 0.15$ |        |        |         |         |         |         |
| -2.02           | -0.096 | 0.0148 | 0.0013  | 0.0016  | -0.0017 | -0.0005 |
| .05             | .011   | .0132  | .0031   | .0010   | -.0020  | -.0004  |
| 2.13            | .117   | .0159  | .0013   | .0004   | -.0009  | -.0005  |
| 4.21            | .233   | .0208  | -.0014  | .0005   | -.0007  | -.0002  |
| 6.29            | .349   | .0301  | -.0074  | -.0004  | -.0002  | -.0002  |
| 8.37            | .472   | .0479  | -.0180  | .0027   | .0004   | -.0013  |
| 10.46           | .596   | .0889  | -.0258  | .0017   | -.0024  | -.0003  |
| 12.54           | .712   | .1419  | -.0123  | .0037   | -.0028  | -.0002  |
| 14.63           | .808   | .1986  | -.0194  | .0014   | -.0025  | -.0005  |
| 16.66           | .896   | .2580  | -.0103  | .0010   | -.0054  | 0.0008  |
| 18.69           | .937   | .3107  | -.0056  | .0010   | -.0018  | -.0006  |
| 20.70           | .948   | .3648  | -.0431  | -.0009  | .0014   | 0.0003  |
| $\eta_0 = 0.20$ |        |        |         |         |         |         |
| -2.03           | -0.112 | 0.0208 | -0.0040 | -0.0004 | 0.0003  | 0.0005  |
| .04             | -.012  | .0195  | -.0037  | -.0005  | .0003   | 0.0008  |
| 2.12            | .102   | .0219  | -.0018  | -.0014  | .0012   | 0.0006  |
| 4.19            | .206   | .0264  | -.0041  | -.0029  | .0035   | 0.0006  |
| 6.27            | .322   | .0349  | -.0068  | -.0015  | .0027   | 0.0004  |
| 8.35            | .437   | .0500  | -.0162  | -.0009  | .0068   | -.0013  |
| 10.44           | .573   | .0885  | -.0237  | -.0013  | .0014   | -.0016  |
| 12.52           | .680   | .1407  | -.0180  | -.0051  | -.0004  | -.0015  |
| 14.59           | .795   | .2006  | -.0237  | -.0023  | -.0046  | 0       |
| 16.63           | .870   | .2541  | -.0062  | -.0017  | -.0012  | -.0006  |
| 18.68           | .915   | .3100  | -.0093  | -.0017  | -.0008  | -.0008  |
| 20.69           | .929   | .3607  | -.0427  | -.0008  | .0030   | -.0008  |
| $h/c = 0.05$    |        |        |         |         |         |         |
| $\eta_1 = 0.15$ |        |        |         |         |         |         |
| -2.05           | -0.139 | 0.0307 | 0.0038  | -0.0036 | 0.0079  | 0.0040  |
| .02             | -.035  | .0289  | .0038   | -.0049  | .0086   | 0.0035  |
| 2.09            | .065   | .0302  | .0093   | -.0067  | .0110   | 0.0035  |
| 4.17            | .175   | .0337  | .0065   | -.0081  | .0129   | 0.0034  |
| 6.24            | .278   | .0405  | .0053   | -.0093  | .0149   | 0.0028  |
| 8.32            | .398   | .0549  | -.0055  | -.0056  | .0184   | 0.0005  |
| 10.41           | .543   | .0990  | -.0136  | -.0034  | .0120   | -.0002  |
| 12.51           | .678   | .1441  | -.0146  | -.0009  | .0034   | 0.0003  |
| 14.58           | .781   | .2018  | -.0049  | -.0008  | .0028   | -.0002  |
| 16.63           | .861   | .2522  | -.0163  | -.0005  | .0009   | -.0007  |
| 18.68           | .919   | .3104  | -.0037  | -.0018  | .0032   | -.0022  |
| 20.69           | .923   | .3566  | -.0424  | .0013   | .0020   | -.0017  |
| $\eta_0 = 0.80$ |        |        |         |         |         |         |
| -2.05           | -0.139 | 0.0307 | 0.0038  | -0.0036 | 0.0079  | 0.0040  |
| .02             | -.035  | .0289  | .0038   | -.0049  | .0086   | 0.0035  |
| 2.09            | .065   | .0302  | .0093   | -.0067  | .0110   | 0.0035  |
| 4.17            | .175   | .0337  | .0065   | -.0081  | .0129   | 0.0034  |
| 6.24            | .278   | .0405  | .0053   | -.0093  | .0149   | 0.0028  |
| 8.32            | .398   | .0549  | -.0055  | -.0056  | .0184   | 0.0005  |
| 10.41           | .543   | .0990  | -.0136  | -.0034  | .0120   | -.0002  |
| 12.51           | .678   | .1441  | -.0146  | -.0009  | .0034   | 0.0003  |
| 14.58           | .781   | .2018  | -.0049  | -.0008  | .0028   | -.0002  |
| 16.63           | .861   | .2522  | -.0163  | -.0005  | .0009   | -.0007  |
| 18.68           | .919   | .3104  | -.0037  | -.0018  | .0032   | -.0022  |
| 20.69           | .923   | .3566  | -.0424  | .0013   | .0020   | -.0017  |
| $h/c = 0.05$    |        |        |         |         |         |         |
| $\eta_1 = 0.15$ |        |        |         |         |         |         |
| -2.05           | -0.133 | 0.0325 | 0.0082  | -0.0073 | 0.0079  | 0.0057  |
| .03             | -.030  | .0311  | .0104   | -.0097  | .0105   | 0.0058  |
| 2.10            | .072   | .0323  | .0119   | -.0110  | .0123   | 0.0056  |
| 4.17            | .181   | .0358  | .0105   | -.0137  | .0150   | 0.0055  |
| 6.24            | .289   | .0426  | .0092   | -.0138  | .0159   | 0.0048  |
| 8.33            | .411   | .0576  | .0033   | -.0138  | .0211   | 0.0027  |
| 10.42           | .549   | .0911  | -.0097  | -.0032  | .0150   | 0.0004  |
| 12.52           | .678   | .1466  | -.0136  | -.0034  | .0046   | 0.0009  |
| 14.59           | .798   | .2037  | -.0193  | -.0039  | .0031   | 0.0009  |
| 16.64           | .872   | .2573  | -.0074  | -.0005  | .0006   | 0.0003  |
| 18.67           | .904   | .3051  | -.0053  | -.0017  | .0032   | -.0021  |
| 20.70           | .938   | .3594  | -.0448  | .0017   | .0003   | -.0030  |
| $\eta_0 = 1.00$ |        |        |         |         |         |         |
| -2.05           | -0.133 | 0.0325 | 0.0082  | -0.0073 | 0.0079  | 0.0057  |
| .03             | -.030  | .0311  | .0104   | -.0097  | .0105   | 0.0058  |
| 2.10            | .072   | .0323  | .0119   | -.0110  | .0123   | 0.0056  |
| 4.17            | .181   | .0358  | .0105   | -.0137  | .0150   | 0.0055  |
| 6.24            | .289   | .0426  | .0092   | -.0138  | .0159   | 0.0048  |
| 8.33            | .411   | .0576  | .0033   | -.0138  | .0211   | 0.0027  |
| 10.42           | .549   | .0911  | -.0097  | -.0032  | .0150   | 0.0004  |
| 12.52           | .678   | .1466  | -.0136  | -.0034  | .0046   | 0.0009  |
| 14.59           | .798   | .2037  | -.0193  | -.0039  | .0031   | 0.0009  |
| 16.64           | .872   | .2573  | -.0074  | -.0005  | .0006   | 0.0003  |
| 18.67           | .904   | .3051  | -.0053  | -.0017  | .0032   | -.0021  |
| 20.70           | .938   | .3594  | -.0448  | .0017   | .0003   | -.0030  |

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TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED - Continued  
(b)  $x_s/c = 0.70$ ;  $h/c = 0.05$  and  $0.10$

| $\alpha$     | $C_L$  | $C_D$  | $C_m$  | $C_Y$           | $C_l$           | $C_n$   | $\alpha$     | $C_L$  | $C_D$  | $C_m$  | $C_Y$           | $C_l$           | $C_n$  |
|--------------|--------|--------|--------|-----------------|-----------------|---------|--------------|--------|--------|--------|-----------------|-----------------|--------|
| $h/c = 0.05$ |        |        |        | $\eta_1 = 0.40$ | $\eta_0 = 1.00$ |         | $h/c = 0.05$ |        |        |        | $\eta_1 = 0.60$ | $\eta_0 = 1.00$ |        |
| -2.04        | -0.127 | 0.0264 | 0.0110 | -0.0056         | 0.0032          | 0.0051  | -2.03        | -0.117 | 0.0207 | 0.0068 | -0.0031         | 0.0002          | 0.0039 |
| .05          | -.021  | .0246  | .0123  | -.0066          | .0054           | .0051   | .04          | -.007  | .0192  | .0076  | -.0042          | .0017           | .0037  |
| 2.11         | .082   | .0261  | .0121  | -.0077          | .0067           | .0047   | 2.12         | .097   | .0209  | .0116  | -.0050          | .0028           | .0032  |
| 4.18         | .195   | .0299  | .0111  | -.0098          | .0098           | .0048   | 4.20         | .213   | .0253  | .0089  | -.0061          | .0044           | .0035  |
| 6.26         | .307   | .0379  | .0066  | -.0106          | .0108           | .0040   | 6.27         | .326   | .0335  | .0050  | -.0074          | .0062           | .0029  |
| 8.34         | .425   | .0529  | .0022  | -.0082          | .0133           | .0023   | 8.35         | .442   | .0495  | -.0052 | -.0057          | .0088           | .0014  |
| 10.44        | .583   | .0915  | -.0161 | -.0025          | .0051           | .0018   | 10.46        | .603   | .0901  | -.0178 | .0004           | .0004           | .0013  |
| 12.53        | .710   | .1458  | -.0061 | -.0007          | .0220           | .0008   | 12.53        | .706   | .1392  | -.0054 | .0023           | .0009           | -.0015 |
| 14.58        | .790   | .1944  | -.0123 | .0013           | -.0001          | -.0008  | 14.59        | .799   | .1941  | -.0150 | .0022           | -.0002          | -.0014 |
| 16.64        | .876   | .2509  | -.0049 | .0023           | -.0011          | -.0016  | 16.64        | .871   | .2498  | -.0070 | .0037           | -.0018          | -.0012 |
| 18.67        | .913   | .3032  | -.0105 | -.0002          | .0011           | -.0023  | 18.68        | .924   | .3054  | -.0051 | -.0004          | .0003           | -.0013 |
| 20.70        | .941   | .3609  | -.0456 | .0005           | -.0069          | .0003   | 20.70        | .943   | .3609  | -.0421 | .0019           | -.0050          | .0016  |
| $h/c = 0.05$ |        |        |        | $\eta_1 = 0.80$ | $\eta_0 = 1.00$ |         | $h/c = 0.05$ |        |        |        | $\eta_1 = 0.20$ | $\eta_0 = 0.60$ |        |
| -2.03        | -0.106 | 0.0163 | 0.0066 | -0.0015         | -0.0018         | 0.0019  | -2.04        | -0.132 | 0.0254 | 0.0039 | -0.0050         | 0.0023          | 0.0029 |
| .05          | .003   | .0147  | .0092  | -.0018          | -.0019          | .0020   | .03          | -.023  | .0240  | .0018  | -.0052          | .0030           | .0026  |
| 2.12         | .108   | .0167  | .0070  | -.0026          | -.0008          | .0018   | 2.10         | .076   | .0260  | .0039  | -.0067          | .0049           | .0024  |
| 4.20         | .226   | .0216  | .0078  | -.0036          | .0007           | .0022   | 4.18         | .189   | .0301  | .0017  | -.0081          | .0069           | .0025  |
| 6.28         | .336   | .0300  | .0011  | -.0036          | .0010           | .0016   | 6.25         | .300   | .0379  | -.0005 | -.0086          | .0087           | .0022  |
| 8.36         | .452   | .0465  | -.0104 | -.0023          | .0031           | .0001   | 8.33         | .415   | .0522  | -.0088 | -.0078          | .0114           | .0003  |
| 10.44        | .606   | .0863  | -.0135 | .0035           | -.0020          | .0006   | 10.42        | .558   | .0877  | -.0171 | -.0001          | .0069           | -.0003 |
| 12.53        | .706   | .1384  | -.0058 | .0028           | -.0012          | -.0009  | 12.52        | .693   | .1463  | -.0133 | -.0028          | .0119           | .0015  |
| 14.59        | .796   | .1944  | -.0147 | .0023           | -.0011          | -.0007  | 14.58        | .791   | .2014  | -.0179 | -.0043          | .0027           | .0011  |
| 16.64        | .884   | .2519  | -.0050 | .0033           | -.0022          | -.0008  | 16.64        | .879   | .2578  | -.0055 | -.0016          | .0008           | .0005  |
| 18.68        | .927   | .3088  | -.0107 | -.0011          | .0029           | -.0018  | 18.68        | .914   | .3048  | -.0020 | -.0039          | .0053           | .0027  |
| 20.70        | .941   | .3631  | -.0459 | -.0022          | -.0018          | .0010   | 20.70        | .940   | .3595  | -.0379 | -.0020          | -.0029          | .0006  |
| $h/c = 0.10$ |        |        |        | $\eta_1 = 0.15$ | $\eta_0 = 0.20$ |         | $h/c = 0.10$ |        |        |        | $\eta_1 = 0.15$ | $\eta_0 = 0.40$ |        |
| -2.03        | -0.095 | 0.0169 | 0.0014 | 0.0005          | 0.0003          | -0.0004 | -2.07        | -0.154 | 0.0312 | 0.0038 | -0.0029         | 0.0068          | 0.0015 |
| .05          | .016   | .0156  | .0003  | 0               | -.0006          | -.0005  | 0            | -.051  | .0293  | .0032  | -.0027          | .0078           | .0014  |
| 2.12         | .120   | .0177  | -.0006 | -.0012          | .0004           | -.0002  | 2.08         | .055   | .0308  | .0023  | -.0036          | .0086           | .0012  |
| 4.20         | .231   | .0228  | -.0011 | -.0018          | .0011           | -.0001  | 4.15         | .161   | .0342  | .0011  | -.0028          | .0096           | .0004  |
| 6.28         | .340   | .0310  | -.0062 | -.0004          | .0007           | -.0005  | 6.23         | .272   | .0418  | -.0039 | -.0028          | .0100           | -.0004 |
| 8.36         | .462   | .0485  | -.0146 | .0025           | -.0017          | -.0030  | 8.31         | .386   | .0553  | -.0093 | .0008           | .0130           | -.0040 |
| 10.45        | .592   | .0885  | -.0206 | .0047           | -.0011          | -.0024  | 10.40        | .511   | .0870  | -.0154 | .0059           | .0121           | -.0053 |
| 12.53        | .707   | .1424  | -.0149 | .0070           | -.0018          | -.0025  | 12.49        | .642   | .1415  | -.0178 | .0077           | .0058           | -.0050 |
| 14.59        | .794   | .1947  | -.0116 | .0039           | 0               | -.0027  | 14.57        | .759   | .1982  | -.0172 | .0047           | -.0001          | -.0032 |
| 16.66        | .884   | .2537  | -.0100 | .0030           | -.0035          | -.0002  | 16.62        | .826   | .2493  | -.0044 | .0044           | .0056           | -.0050 |
| 18.69        | .928   | .3093  | -.0059 | .0009           | -.0033          | -.0004  | 18.66        | .892   | .3069  | -.0033 | -.0022          | .0092           | -.0048 |
| 20.69        | .938   | .3632  | -.0374 | .0084           | -.0011          | -.0007  | 20.70        | .948   | .3665  | -.0289 | -.0008          | .0027           | -.0024 |
| $h/c = 0.10$ |        |        |        | $\eta_1 = 0.15$ | $\eta_0 = 0.60$ |         | $h/c = 0.10$ |        |        |        | $\eta_1 = 0.15$ | $\eta_0 = 0.80$ |        |
| -2.09        | -0.193 | 0.0410 | 0.0096 | -0.0061         | 0.0119          | 0.0044  | -2.10        | -0.207 | 0.0497 | 0.0174 | -0.0087         | 0.0195          | 0.0077 |
| -.02         | -.089  | .0389  | .0078  | -.0067          | .0142           | .0040   | -.04         | -.112  | .0473  | .0173  | -.0108          | .0211           | .0078  |
| 2.05         | .018   | .0385  | .0102  | -.0080          | .0158           | .0033   | 2.04         | -.004  | .0464  | .0161  | -.0126          | .0241           | .0071  |
| 4.13         | .123   | .0421  | .0078  | -.0082          | .0175           | .0026   | 4.11         | .101   | .0493  | .0180  | -.0150          | .0258           | .0068  |
| 6.21         | .242   | .0480  | .0056  | -.0092          | .0186           | .0025   | 6.18         | .207   | .0541  | .0156  | -.0157          | .0271           | .0058  |
| 8.28         | .351   | .0595  | .0014  | -.0076          | .0192           | 0       | 8.26         | .317   | .0639  | .0117  | -.0139          | .0309           | .0024  |
| 10.37        | .473   | .0875  | -.0062 | .0015           | .0216           | -.0043  | 10.34        | .436   | .0874  | .0087  | -.0031          | .0326           | -.0042 |
| 12.48        | .634   | .1451  | -.0080 | -.0018          | .0107           | -.0033  | 12.46        | .605   | .1428  | -.0050 | .0012           | .0178           | -.0037 |
| 14.53        | .711   | .1935  | -.0022 | .0001           | .0133           | -.0040  | 14.63        | .702   | .1920  | -.0032 | 0               | .0152           | -.0045 |
| 16.60        | .810   | .2491  | .0026  | .0009           | .0112           | -.0056  | 16.60        | .800   | .2452  | .0007  | .0013           | .0081           | -.0054 |
| 18.66        | .889   | .3069  | -.0026 | -.0001          | .0054           | -.0038  | 18.66        | .894   | .3067  | .0003  | .0008           | .0056           | -.0041 |
| 20.70        | .946   | .3628  | -.0232 | .0013           | .0001           | -.0017  | 20.69        | .936   | .3612  | -.0236 | .0003           | -.0010          | -.0008 |

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TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED - Continued  
(c)  $x_s/c = 0.70$ ;  $h/c = 0.10$  and  $0.15$

| $\alpha$ | $C_L$  | $C_D$  | $C_m$        | $C_Y$   | $C_l$           | $C_n$           | $\alpha$ | $C_L$  | $C_D$        | $C_m$  | $C_Y$   | $C_l$           | $C_n$           |
|----------|--------|--------|--------------|---------|-----------------|-----------------|----------|--------|--------------|--------|---------|-----------------|-----------------|
|          |        |        |              |         | $\eta_1 = 0.15$ | $\eta_0 = 1.00$ |          |        |              |        |         |                 |                 |
|          |        |        | $h/c = 0.10$ |         |                 |                 |          |        | $h/c = 0.10$ |        |         | $\eta_1 = 0.20$ | $\eta_0 = 1.00$ |
| -2.11    | -0.209 | 0.0567 | 0.0200       | -0.0106 | 0.0228          | 0.0108          | -2.09    | -0.188 | 0.0540       | 0.0182 | -0.0142 | 0.0200          | 0.0118          |
| -0.03    | -0.106 | 0.0537 | 0.0224       | -0.0130 | 0.0257          | 0.0102          | -0.03    | -0.096 | 0.0510       | 0.0245 | -0.0159 | 0.0233          | 0.0116          |
| 2.04     | -0.006 | 0.0529 | 0.0216       | -0.0155 | 0.0280          | 0.0102          | 2.05     | 0.008  | 0.0513       | 0.0237 | -0.0188 | 0.0252          | 0.0115          |
| 4.10     | .093   | 0.0546 | 0.0207       | -0.0179 | 0.0310          | .0094           | 4.12     | .112   | 0.0533       | 0.0273 | -0.0209 | 0.0298          | 0.0105          |
| 6.18     | .199   | 0.0584 | 0.0219       | -0.0195 | 0.0334          | .0083           | 6.19     | .214   | 0.0575       | 0.0255 | -0.0222 | 0.0311          | 0.0093          |
| 8.26     | .314   | 0.0695 | 0.0170       | -0.0174 | 0.0362          | .0046           | 8.27     | .325   | 0.0670       | 0.0218 | -0.0194 | 0.0331          | .0061           |
| 10.34    | .432   | 0.0944 | 0.0105       | -.0065  | 0.0386          | -.0021          | 10.35    | .447   | 0.0928       | 0.0172 | -.0097  | 0.0380          | -.0013          |
| 12.47    | .613   | 1.455  | -.0028       | -.0004  | 0.0173          | -.0037          | 12.47    | .615   | 1.428        | 0.0007 | -.0040  | 0.0170          | -.0013          |
| 14.53    | .709   | 1.925  | -.0017       | -.0004  | 0.0149          | -.0050          | 14.54    | .725   | 1.946        | -.0003 | -.0057  | 0.0136          | -.0012          |
| 16.60    | .807   | 2.465  | 0.0046       | 0.0001  | 0.0113          | -.0053          | 16.63    | .848   | 2.555        | -.0024 | -.0063  | 0.0079          | -.0009          |
| 18.65    | .882   | 3.040  | -.0042       | 0.0025  | 0.0072          | -.0052          | 18.67    | .908   | 3.080        | -.0065 | -.0039  | 0.0025          | -.0005          |
| 20.70    | .942   | 3.618  | -.0300       | 0.0033  | -.0004          | -.0020          | 20.70    | .942   | 3.549        | -.0298 | 0.0073  | -.0037          | -.0029          |
|          |        |        | $h/c = 0.10$ |         | $\eta_1 = 0.40$ | $\eta_0 = 1.00$ |          |        |              |        |         |                 |                 |
| -2.06    | -0.149 | 0.0425 | 0.0163       | -0.0133 | 0.0112          | 0.0116          | -2.05    | -0.126 | 0.0305       | 0.0130 | -0.0076 | 0.0058          | 0.0083          |
| 0        | -.051  | 0.0393 | 0.0173       | -0.0140 | 0.0145          | 0.0111          | 0        | -.019  | 0.0283       | 0.0140 | -0.0096 | 0.0087          | 0.0087          |
| 2.08     | .055   | 0.0396 | 0.0216       | -.0164  | 0.0173          | 0.0112          | 2.10     | .083   | 0.0291       | 0.0166 | -.0105  | 0.0102          | 0.0084          |
| 4.15     | .159   | 0.0422 | 0.0229       | -.0182  | 0.0201          | 0.0103          | 4.17     | .193   | 0.0321       | 0.0171 | -.0120  | 0.0130          | 0.0081          |
| 6.22     | .264   | 0.0481 | 0.0209       | -.0208  | 0.0235          | .0099           | 6.25     | .307   | 0.0389       | 0.0162 | -.0138  | 0.0147          | 0.0075          |
| 8.30     | .379   | 0.0613 | 0.0614       | -.0167  | 0.0252          | .0065           | 8.33     | .423   | 0.0541       | 0.0100 | -.0095  | 0.0166          | .0049           |
| 10.40    | .318   | 0.0925 | 0.0026       | -.0085  | 0.0214          | .0017           | 10.45    | .587   | 0.0917       | 0.0112 | -.0029  | 0.0058          | 0.0024          |
| 12.52    | .689   | 1.456  | -.0044       | -.0038  | 0.0071          | .0013           | 12.53    | .704   | 1.391        | -.0070 | -.0029  | 0.0018          | -.0007          |
| 14.59    | .792   | 1.942  | -.0038       | -.0007  | 0.0035          | -.0015          | 14.59    | .796   | 1.903        | -.0080 | 0.0034  | 0.0011          | -.0021          |
| 16.64    | .866   | 2.463  | -.0063       | 0.0038  | -.0013          | -.0023          | 16.64    | .860   | 2.449        | -.0124 | 0.0021  | -.0013          | -.0018          |
| 18.68    | .926   | 3.039  | -.0108       | 0.0022  | -.0082          | -.0017          | 18.68    | .922   | 3.057        | -.0158 | 0.0012  | -.0006          | -.0013          |
| 20.71    | .958   | 3.611  | -.0474       | 0.0071  | -.0070          | -.0019          | 20.71    | .957   | 3.607        | -.0386 | 0.0029  | -.0075          | -.0001          |
|          |        |        | $h/c = 0.10$ |         | $\eta_1 = 0.80$ | $\eta_0 = 1.00$ |          |        |              |        |         |                 |                 |
| -2.04    | -0.109 | 0.0207 | 0.0094       | -0.0035 | 0.0020          | 0.0048          | -2.05    | -0.190 | 0.0389       | 0.0167 | -0.0083 | 0.0100          | 0.0052          |
| .04      | .002   | 0.0186 | 0.0113       | -.0040  | 0.0037          | 0.0047          | -.02     | -.093  | 0.0362       | 0.0165 | -.0087  | 0.0118          | .0045           |
| 2.12     | .113   | 0.0200 | 0.0121       | -.0053  | 0.0033          | 0.0046          | 2.06     | .011   | 0.0367       | 0.0177 | -.0093  | 0.0138          | .0039           |
| 4.19     | .223   | 0.0245 | 0.0116       | -.0071  | 0.0065          | 0.0047          | 4.13     | .123   | 0.0403       | 0.0152 | -.0101  | 0.0163          | .0037           |
| 6.27     | .331   | 0.0322 | 0.0066       | -.0075  | 0.0062          | 0.0044          | 6.20     | .230   | 0.0473       | 0.0137 | -.0121  | 0.0182          | .0026           |
| 8.36     | .462   | 0.0494 | -.0016       | -.0027  | 0.0065          | 0.0019          | 8.28     | .346   | 0.0597       | 0.0057 | -.0128  | 0.0234          | .0008           |
| 10.46    | .611   | 0.0869 | 0.0131       | 0.0019  | -.0001          | -.0007          | 10.37    | .480   | 0.0861       | 0.0038 | 0.0017  | 0.0207          | -.0039          |
| 12.54    | .718   | 1.401  | -.0040       | 0.0038  | -.0004          | -.0011          | 12.48    | .627   | 1.410        | -.0049 | -.0038  | 0.0092          | -.0012          |
| 14.59    | .791   | 1.905  | -.0098       | 0.0017  | -.0009          | -.0010          | 14.54    | .730   | 1.989        | -.0049 | -.0066  | 0.0146          | -.0013          |
| 16.64    | .872   | 2.506  | -.0103       | 0.0009  | -.0001          | -.0014          | 16.62    | .843   | 2.571        | 0.0003 | -.0038  | 0.0079          | -.0016          |
| 18.69    | .931   | 3.070  | -.0073       | 0.0018  | -.0009          | -.0004          | 18.67    | .913   | 3.104        | 0.0041 | -.0047  | 0.0069          | -.0018          |
| 20.69    | .937   | 3.571  | -.0381       | 0.0023  | -.0002          | -.0013          | 20.70    | .945   | 3.602        | -.0329 | 0.0013  | -.0027          | -.0003          |
|          |        |        | $h/c = 0.10$ |         | $\eta_1 = 0.4$  | $\eta_0 = 0.6$  |          |        |              |        |         |                 |                 |
| -2.06    | -0.142 | 0.0266 | 0.0102       | -.0067  | 0.0061          | 0.0044          | -2.03    | -0.105 | 0.0191       | 0.0015 | 0       | 0.0013          | -0.0006         |
| .02      | -.034  | 0.0247 | 0.0109       | -.0075  | 0.0075          | 0.0041          | .04      | .001   | 0.0177       | -.0005 | 0.0011  | 0               | -0.0006         |
| 2.09     | .073   | 0.0263 | 0.0113       | -.0085  | 0.0086          | 0.0044          | 2.12     | .111   | 0.0200       | -.0004 | -.0005  | 0.0021          | -0.0006         |
| 4.16     | .179   | 0.0304 | 0.0132       | -.0100  | 0.0116          | 0.0040          | 4.19     | .219   | 0.0247       | -.0024 | 0.0003  | 0.0014          | -0.0012         |
| 6.25     | .296   | 0.0377 | 0.0097       | -.0109  | 0.0119          | 0.0040          | 6.27     | .332   | 0.0333       | -.0084 | -.0013  | 0.0035          | -0.0012         |
| 8.32     | .409   | 0.0522 | 0.0045       | -.0080  | 0.0144          | 0.0015          | 8.35     | .452   | 0.0496       | 0.0138 | 0.0052  | 0.0030          | -0.0041         |
| 10.42    | .551   | 0.0880 | 0.0056       | -.0049  | 0.0101          | 0.0007          | 10.44    | .579   | 0.0882       | 0.0206 | 0.0072  | 0.0015          | -0.0040         |
| 12.53    | .704   | 1.489  | -.0055       | -.0041  | 0.0057          | 0.0023          | 12.52    | .694   | 1.424        | -.0173 | 0.0090  | -.0008          | -.0048          |
| 14.59    | .787   | 1.935  | -.0068       | -.0010  | 0.0035          | -.0008          | 14.58    | .771   | 1.937        | -.0185 | 0.0061  | -.0011          | -.0037          |
| 16.65    | .873   | 2.494  | -.0052       | 0.0017  | 0               | -.0009          | 16.65    | .873   | 2.537        | -.0124 | 0.0060  | -.0059          | -.0019          |
| 18.68    | .925   | 3.065  | -.0089       | 0.0019  | -.0003          | -.0011          | 18.68    | .924   | 3.118        | -.0092 | 0.0031  | -.0050          | -.0009          |
| 20.71    | .957   | 3.664  | -.0450       | 0.0010  | -.0018          | -.0010          | 20.71    | .957   | 3.690        | -.0225 | 0.0019  | 0.0110          | -.0015          |

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TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED - Continued  
(d)  $x_s/c = 0.70$ ;  $h/c = 0.15$

| $\alpha$                                     | $c_L$  | $c_D$  | $c_m$  | $c_Y$   | $c_l$  | $c_n$  | $\alpha$ | $c_L$  | $c_D$  | $c_m$  | $c_Y$   | $c_l$  | $c_n$  |
|--|--------|--------|--------|---------|--------|--------|----------|--------|--------|--------|---------|--------|--------|
| $h/c = 0.15$ $\eta_1 = 0.15$ $\eta_0 = 0.40$ |        |        |        |         |        |        |          |        |        |        |         |        |        |
| -2.09  | -0.189 | 0.0412 | 0.0053 | -0.0017 | 0.0111 | 0.0010 | -2.12    | -0.235 | 0.0565 | 0.0173 | -0.0081 | 0.0212 | 0.0056 |
| -.02   | -.084  | .0386  | .0064  | -.0030  | .0114  | .0006  | -.05     | -.129  | .0539  | .0169  | -.0102  | .0218  | .0055  |
| 2.06   | .022   | .0395  | .0048  | -.0033  | .0128  | .0004  | 2.02     | -.024  | .0525  | .0148  | -.0121  | .0239  | .0047  |
| 4.13   | .127   | .0428  | .0038  | -.0036  | .0154  | -.0009 | 4.09     | .078   | .0564  | .0143  | -.0136  | .0259  | .0041  |
| 6.20   | .233   | .0489  | -.0011 | -.0041  | .0165  | -.0016 | 6.17     | .188   | .0625  | .0106  | -.0150  | .0278  | .0031  |
| 8.28   | .349   | .0634  | -.0105 | -.0022  | .0207  | -.0047 | 8.25     | .294   | .0727  | .0068  | -.0138  | .0310  | 0      |
| 10.37  | .477   | .0920  | -.0180 | -.0070  | .0187  | -.0094 | 10.33    | .416   | .0967  | -.0023 | -.0022  | .0323  | -.0070 |
| 12.46  | .608   | .1446  | -.0175 | .0052   | .0095  | -.0071 | 12.43    | .565   | .1509  | -.0094 | -.0005  | .0208  | -.0052 |
| 14.54  | .714   | .1964  | -.0226 | .0050   | .0043  | -.0060 | 14.49    | .652   | .1985  | .0014  | -.0048  | .0216  | -.0053 |
| 16.59  | .796   | .2497  | -.0096 | .0056   | .0002  | -.0062 | 16.57    | .760   | .2483  | .0069  | -.0010  | .0193  | -.0086 |
| 18.64  | .858   | .3052  | -.0101 | -.0004  | .0098  | -.0070 | 18.64    | .859   | .3071  | -.0041 | -.0018  | .0131  | -.0074 |
| 20.69  | .935   | .3691  | -.0143 | -.0012  | .0031  | -.0037 | 20.68    | .926   | .3651  | -.0205 | .0045   | .0007  | -.0050 |
| $h/c = 0.15$ $\eta_1 = 0.15$ $\eta_0 = 0.80$ |        |        |        |         |        |        |          |        |        |        |         |        |        |
| -2.14  | -0.252 | 0.0692 | 0.0275 | -0.0138 | 0.0269 | 0.0105 | -2.13    | -0.249 | 0.0790 | 0.0299 | -0.0189 | 0.0298 | 0.0162 |
| -.07   | -.158  | .0645  | .0286  | -.0156  | .0296  | .0100  | -.07     | -.157  | .0743  | .0326  | -.0195  | .0328  | .0148  |
| 2.00   | -.052  | .0641  | .0254  | -.0191  | .0312  | .0100  | 2.00     | -.057  | .0738  | .0342  | -.0229  | .0363  | .0147  |
| 4.08   | .058   | .0655  | .0244  | -.0205  | .0337  | .0088  | 4.08     | .051   | .0759  | .0323  | -.0256  | .0377  | .0142  |
| 6.15   | .158   | .0704  | .0216  | -.0217  | .0355  | .0074  | 6.15     | .151   | .0781  | .0316  | -.0299  | .0429  | .0128  |
| 8.23   | .268   | .0793  | .0155  | -.0215  | .0404  | .0040  | 8.22     | .254   | .0844  | .0269  | -.0277  | .0438  | .0088  |
| 10.31  | .395   | .1040  | .0092  | -.0129  | .0414  | -.0012 | 10.30    | .378   | .1083  | .0176  | -.0182  | .0461  | .0020  |
| 12.42  | .549   | .1505  | -.0017 | -.0021  | .0307  | -.0062 | 12.42    | .546   | .1493  | .0026  | -.0066  | .0281  | -.0035 |
| 14.49  | .649   | .1966  | .0037  | -.0044  | .0223  | -.0066 | 14.49    | .650   | .1967  | .0005  | -.0040  | .0247  | -.0069 |
| 16.57  | .757   | .2458  | .0097  | .0009   | .0146  | -.0084 | 16.57    | .762   | .2463  | .0087  | .0007   | .0180  | -.0087 |
| 18.64  | .859   | .3043  | .0031  | -.0001  | .0093  | -.0071 | 18.64    | .867   | .3053  | .0063  | .0018   | .0116  | -.0091 |
| 20.69  | .940   | .3676  | -.0191 | .0018   | .0021  | -.0052 | 20.69    | .933   | .3652  | -.0132 | .0050   | .0018  | -.0055 |
| $h/c = 0.15$ $\eta_1 = 0.20$ $\eta_0 = 1.00$ |        |        |        |         |        |        |          |        |        |        |         |        |        |
| -2.14  | -0.263 | 0.0756 | 0.0392 | -0.0219 | 0.0286 | 0.0175 | -2.09    | -0.199 | 0.0577 | 0.0315 | -0.0207 | 0.0185 | 0.0173 |
| -.07   | -.164  | .0723  | .0401  | -.0227  | .0311  | .0164  | -.02     | -.094  | .0548  | .0326  | -.0222  | .0212  | .0169  |
| 2.00   | -.068  | .0722  | .0453  | -.0244  | .0326  | .0155  | 2.05     | -.001  | .0542  | .0367  | -.0245  | .0242  | .0162  |
| 4.07   | .039   | .0722  | .0428  | -.0266  | .0369  | .0140  | 4.12     | .103   | .0561  | .0352  | -.0268  | .0270  | .0156  |
| 6.14   | .142   | .0753  | .0406  | -.0274  | .0411  | .0122  | 6.19     | .209   | .0610  | .0332  | -.0283  | .0301  | .0141  |
| 8.22   | .256   | .0845  | .0350  | -.0295  | .0441  | .0099  | 8.27     | .332   | .0725  | .0558  | -.0302  | .0351  | .0115  |
| 10.31  | .389   | .1087  | .0304  | -.0170  | .0442  | .0033  | 10.36    | .461   | .0985  | .0235  | -.0166  | .0346  | .0057  |
| 12.42  | .550   | .1504  | .0132  | -.0107  | .0309  | -.0015 | 12.49    | .640   | .1453  | .0120  | -.0091  | .0153  | .0016  |
| 14.51  | .677   | .1989  | .0122  | -.0072  | .0222  | -.0033 | 14.59    | .796   | .2012  | -.0126 | -.0013  | .0035  | -.0004 |
| 16.58  | .786   | .2494  | .0154  | -.0022  | .0123  | -.0045 | 16.64    | .881   | .2496  | -.0023 | .0051   | .0002  | -.0027 |
| 18.65  | .882   | .3047  | .0124  | -.0043  | .0077  | -.0041 | 18.68    | .923   | .3018  | -.0080 | .0041   | -.0015 | -.0030 |
| 20.71  | .953   | .3699  | -.0301 | -.0018  | .0022  | -.0005 | 20.70    | .950   | .3572  | -.0461 | .0032   | -.0088 | -.0007 |
| $h/c = 0.15$ $\eta_1 = 0.60$ $\eta_0 = 1.00$ |        |        |        |         |        |        |          |        |        |        |         |        |        |
| -2.06  | -0.155 | 0.0408 | 0.0242 | -.0126  | 0.0106 | 0.0133 | -2.04    | -0.131 | 0.0256 | 0.0184 | -.0055  | 0.0034 | 0.0073 |
| .01  | -.049  | .0370  | .0262  | -.0134  | .0131  | .0127  | .03      | -.023  | .0231  | .0183  | -.0064  | .0049  | .0067  |
| 2.08   | .051   | .0376  | .0279  | -.0155  | .0149  | .0122  | 2.11     | .085   | .0247  | .0203  | -.0074  | .0064  | .0066  |
| 4.16   | .159   | .0406  | .0265  | -.0178  | .0175  | .0119  | 4.19     | .198   | .0284  | .0196  | -.0095  | .0086  | .0069  |
| 6.23   | .267   | .0472  | .0240  | -.0189  | .0202  | .0109  | 6.25     | .298   | .0353  | .0142  | -.0105  | .0096  | .0062  |
| 8.31   | .392   | .0616  | .0166  | -.0195  | .0240  | .0087  | 8.34     | .436   | .0529  | .0058  | -.0090  | .0122  | .0040  |
| 10.43  | .566   | .0954  | -.0047 | -.0068  | .0107  | .0047  | 10.45    | .596   | .0894  | -.0135 | .0034   | .0001  | .0002  |
| 12.53  | .702   | .1402  | -.0047 | .0013   | .0015  | -.0007 | 12.53    | .702   | .1384  | -.0046 | .0033   | -.0013 | -.0009 |
| 14.59  | .801   | .1937  | -.0145 | .0039   | -.0025 | -.0015 | 14.59    | .800   | .1941  | -.0133 | .0023   | -.0017 | -.0009 |
| 16.64  | .884   | .2491  | -.0029 | .0051   | -.0020 | -.0030 | 16.64    | .884   | .2517  | -.0006 | .0044   | -.0047 | -.0011 |
| 18.68  | .926   | .3039  | -.0106 | .0013   | -.0048 | -.0018 | 18.68    | .924   | .3051  | -.0040 | 0       | .0002  | -.0017 |
| 20.71  | .962   | .3638  | -.0478 | .0008   | -.0086 | .0011  | 20.71    | .962   | .3643  | -.0343 | .0023   | -.0041 | -.0015 |
| $h/c = 0.15$ $\eta_1 = 0.80$ $\eta_0 = 1.00$ |        |        |        |         |        |        |          |        |        |        |         |        |        |
| -2.04  | -0.131 | 0.0256 | 0.0184 | -.0055  | 0.0034 | 0.0073 |          |        |        |        |         |        |        |
| .03  | -.023  | .0231  | .0183  | -.0064  | .0049  | .0067  |          |        |        |        |         |        |        |
| 2.11   | .085   | .0247  | .0203  | -.0074  | .0064  | .0066  |          |        |        |        |         |        |        |
| 4.19   | .198   | .0284  | .0196  | -.0095  | .0086  | .0069  |          |        |        |        |         |        |        |
| 6.25   | .298   | .0353  | .0142  | -.0105  | .0096  | .0062  |          |        |        |        |         |        |        |
| 8.34   | .436   | .0529  | .0058  | -.0090  | .0122  | .0040  |          |        |        |        |         |        |        |
| 10.45  | .596   | .0894  | -.0135 | .0034   | .0001  | .0002  |          |        |        |        |         |        |        |
| 12.53  | .702   | .1384  | -.0046 | .0033   | -.0013 | -.0009 |          |        |        |        |         |        |        |
| 14.59  | .800   | .1941  | -.0133 | .0023   | -.0017 | -.0009 |          |        |        |        |         |        |        |
| 16.64  | .884   | .2517  | -.0006 | .0044   | -.0047 | -.0011 |          |        |        |        |         |        |        |
| 18.68  | .924   | .3051  | -.0040 | 0       | .0002  | -.0017 |          |        |        |        |         |        |        |
| 20.71  | .962   | .3643  | -.0343 | .0023   | -.0041 | -.0015 |          |        |        |        |         |        |        |

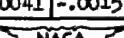


TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED  
(d)  $x_s/c = 0.70$ ;  $h/c = 0.15$  - Concluded

| $\alpha$ | $C_L$        | $C_D$  | $C_m$  | $C_Y$           | $C_l$           | $C_n$  |
|----------|--------------|--------|--------|-----------------|-----------------|--------|
|          | $h/c = 0.15$ |        |        | $\eta_1 = 0.20$ | $\eta_0 = 0.60$ |        |
| -2.12    | -0.241       | 0.0540 | 0.0262 | -0.0124         | 0.0176          | 0.0076 |
| -.05     | -.141        | .0503  | .0266  | -.0124          | .0199           | .0068  |
| 2.02     | -.039        | .0514  | .0251  | -.0131          | .0219           | .0055  |
| 4.10     | .070         | .0541  | .0254  | -.0153          | .0239           | .0048  |
| 6.17     | .175         | .0601  | .0246  | -.0153          | .0260           | .0036  |
| 8.25     | .294         | .0699  | .0166  | -.0181          | .0308           | .0024  |
| 10.33    | .422         | .0968  | .0121  | -.0043          | .0316           | -.0042 |
| 12.45    | .579         | .1473  | .0140  | -.0081          | .0193           | -.0017 |
| 14.50    | .666         | .2004  | .0065  | -.0079          | .0214           | -.0031 |
| 16.58    | .799         | .2548  | .0158  | -.0065          | .0140           | -.0035 |
| 18.66    | .888         | .3094  | .0133  | -.0079          | .0104           | -.0029 |
| 20.71    | .963         | .3733  | -.0291 | -.0054          | -.0021          | .0008  |

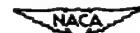


TABLE IX.- AERODYNAMIC CHARACTERISTICS OF MODEL 2 WITH MODIFIED  
LEADING EDGE;  $x_s/c = 0.70$ ;  $h/c = 0$  AND  $0.10$

| $\alpha$ | $C_L$        | $C_D$  | $C_m$           | $C_Y$           | $C_l$   | $C_n$  |
|----------|--------------|--------|-----------------|-----------------|---------|--------|
|          | $h/c = 0$    |        |                 |                 |         |        |
| -2.05    | -0.129       | 0.0148 | 0.0011          | -0.0039         | -0.0004 | 0.0014 |
| -.03     | -.020        | .0127  | .0007           | -.0031          | -.0018  | .0011  |
| 2.10     | .088         | .0140  | 0               | -.0026          | .0001   | .0014  |
| 4.19     | .210         | .0177  | .0035           | -.0033          | .0004   | .0015  |
| 6.26     | .321         | .0259  | .0011           | -.0013          | -.0001  | .0004  |
| 8.35     | .439         | .0367  | -.0021          | .0003           | -.0004  | -.0004 |
| 10.43    | .558         | .0519  | -.0089          | -.0005          | .0001   | .0001  |
| 12.52    | .686         | .0711  | -.0139          | -.0004          | .0003   | .0004  |
| 14.60    | .800         | .0927  | -.0165          | .0018           | -.0012  | 0      |
| 16.68    | .926         | .1238  | -.0219          | .0005           | -.0018  | .0008  |
| 18.49    | 1.009        | .2114  | -.0201          | -.0021          | .0030   | .0002  |
| 20.76    | 1.034        | .3027  | -.0198          | .0001           | .0005   | .0009  |
|          | $h/c = 0.10$ |        | $\eta_1 = 0.15$ | $\eta_0 = 1.00$ |         |        |
| -2.13    | -0.241       | 0.0577 | 0.0061          | -0.0180         | 0.0239  | 0.0144 |
| -.06     | -.139        | .0540  | .0138           | -.0174          | .0236   | .0126  |
| 2.07     | -.042        | .0522  | .0184           | -.0190          | .0266   | .0119  |
| 4.08     | .060         | .0537  | .0177           | -.0230          | .0287   | .0122  |
| 6.16     | .169         | .0579  | .0211           | -.0214          | .0312   | .0102  |
| 8.24     | .281         | .0650  | .0184           | -.0240          | .0344   | .0094  |
| 10.31    | .392         | .0758  | .0172           | -.0233          | .0354   | .0069  |
| 12.40    | .516         | .0891  | .0160           | -.0274          | .0380   | .0055  |
| 14.48    | .635         | .1061  | .0112           | -.0248          | .0363   | .0031  |
| 16.57    | .762         | .1326  | .0027           | -.0290          | .0353   | .0028  |
| 18.66    | .892         | .2011  | -.0168          | -.0060          | .0268   | -.0067 |
| 20.70    | .950         | .2758  | .0008           | .0088           | .0140   | -.0061 |



TABLE X.- AERODYNAMIC CHARACTERISTICS OF MODEL 2 WITH MODIFIED  
LEADING EDGE AND VERTICAL TAIL REMOVED  
(a)  $x_s/c = 0.70$ ;  $h/c = 0, 0.05$ , and  $0.10$

| $\alpha$     | $c_L$           | $c_D$           | $c_m$   | $c_Y$   | $c_l$   | $c_n$  | $h/c = 0$ |
|--------------|-----------------|-----------------|---------|---------|---------|--------|-----------|
| -2.06        | -0.137          | 0.0135          | -0.0010 | -0.0010 | 0.0012  | 0.0003 |           |
| .02          | -.023           | .0115           | .0030   | -.0006  | .0007   | -.0001 |           |
| 2.10         | .087            | .0127           | .0008   | -.0006  | .0008   | -.0003 |           |
| 4.19         | .214            | .0170           | .0021   | 0       | .0003   | -.0004 |           |
| 6.27         | .327            | .0246           | .0013   | 0       | .0007   | -.0003 |           |
| 8.35         | .442            | .0359           | -.0028  | .0003   | .0005   | -.0003 |           |
| 10.43        | .567            | .0512           | -.0069  | -.0006  | .0008   | -.0001 |           |
| 12.52        | .685            | .0700           | -.0136  | .0012   | -.0005  | -.0006 |           |
| 14.60        | .809            | .0931           | -.0188  | .0001   | .0001   | -.0004 |           |
| 16.69        | .937            | .1222           | -.0221  | .0026   | 0       | -.0007 |           |
| 18.76        | 1.032           | .2099           | -.0330  | -.0024  | .0044   | -.0002 |           |
| 20.77        | 1.043           | .2964           | -.0247  | -.0014  | .0013   | -.0005 |           |
| $\alpha$     | $c_L$           | $c_D$           | $c_m$   | $c_Y$   | $c_l$   | $c_n$  |           |
| $h/c = 0.05$ | $\eta_1 = 0.15$ | $\eta_0 = 0.40$ |         |         |         |        |           |
| -2.05        | -0.133          | 0.0216          | -0.0097 | -0.0021 | 0.0012  | 0.0005 |           |
| .02          | -.025           | .0196           | -.0074  | -.0022  | .0020   | .0007  |           |
| 2.10         | .087            | .0210           | -.0056  | -.0018  | .0019   | .0007  |           |
| 4.19         | .191            | .0250           | -.0074  | -.0019  | .0035   | .0007  |           |
| 6.25         | .303            | .0324           | -.0072  | -.0015  | .0031   | .0006  |           |
| 8.33         | .423            | .0439           | -.0116  | -.0019  | .0036   | .0006  |           |
| 10.41        | .535            | .0583           | -.0160  | -.0019  | .0039   | .0004  |           |
| 12.50        | .661            | .0758           | -.0182  | -.0027  | .0049   | .0002  |           |
| 14.58        | .771            | .0970           | -.0213  | -.0031  | .0063   | -.0004 |           |
| 16.66        | .884            | .1238           | -.0263  | -.0018  | .0072   | -.0021 |           |
| 18.74        | 1.003           | .1996           | -.0382  | .0012   | .0068   | -.0028 |           |
| 20.81        | 1.044           | .2918           | -.0176  | .0041   | .0033   | -.0016 |           |
| $h/c = 0.05$ | $\eta_1 = 0.60$ | $\eta_0 = 1.00$ |         |         |         |        |           |
| -2.05        | -0.132          | 0.0217          | 0.0003  | -0.0048 | 0.0017  | 0.0040 |           |
| .03          | -.029           | .0195           | .0037   | -.0048  | .0027   | .0040  |           |
| 2.10         | .080            | .0206           | .0060   | -.0052  | .0042   | .0042  |           |
| 4.17         | .192            | .0243           | .0064   | -.0055  | .0047   | .0037  |           |
| 6.26         | .310            | .0317           | .0042   | -.0065  | .0067   | .0037  |           |
| 8.33         | .424            | .0426           | .0006   | -.0067  | .0057   | .0039  |           |
| 10.42        | .550            | .0573           | -.0038  | -.0074  | .0067   | .0031  |           |
| 12.51        | .671            | .0757           | -.0079  | -.0082  | .0069   | .0029  |           |
| 14.59        | .792            | .0975           | -.0101  | -.0078  | .0064   | .0033  |           |
| 16.70        | .921            | .1262           | -.0137  | -.0075  | .0053   | .0032  |           |
| 18.75        | 1.025           | .2091           | -.0333  | -.0017  | .0060   | -.0011 |           |
| 20.76        | 1.036           | .2975           | -.0256  | .0022   | .0028   | -.0012 |           |
| $h/c = 0.10$ | $\eta_1 = 0.15$ | $\eta_0 = 1.00$ |         |         |         |        |           |
| -2.10        | -0.187          | 0.0315          | -0.0095 | -0.0034 | -0.0062 | 0.0123 | 0.0052    |
| .01          | -.077           | .0295           | -.0062  | -.0028  | .0142   | 0.0054 |           |
| 2.06         | .029            | .0352           | -.0031  | -.0017  | .0112   | 0.0052 |           |
| 4.14         | .138            | .0346           | .0055   | -.0098  | .0171   | 0.0046 |           |
| 6.21         | .251            | .0405           | -.0072  | -.0118  | .0195   | 0.0047 |           |
| 8.29         | .366            | .0505           | .0034   | -.0132  | .0210   | 0.0045 |           |
| 10.38        | .484            | .0627           | -.0020  | -.0145  | .0221   | 0.0040 |           |
| 12.55        | .612            | .0794           | -.0022  | -.0154  | .0229   | 0.0028 |           |
| 14.55        | .726            | .0995           | -.0080  | -.0181  | .0238   | 0.0019 |           |
| 16.64        | .856            | .1258           | -.0108  | -.0168  | .0240   | 0.0011 |           |
| 18.73        | .992            | .2016           | -.0388  | -.0047  | .0142   | -.0031 |           |
| 20.76        | 1.040           | .2890           | -.0203  | -.0050  | .0058   | -.0020 |           |
| $h/c = 0.10$ | $\eta_1 = 0.15$ | $\eta_0 = 1.00$ |         |         |         |        |           |
| -2.10        | -0.187          | 0.0315          | -0.0095 | -0.0034 | 0.0085  | 0.0012 |           |
| .01          | -.077           | .0295           | -.0062  | -.0028  | .0091   | 0.0009 |           |
| 2.06         | .029            | .0352           | -.0031  | -.0017  | .0102   | 0      |           |
| 4.13         | .135            | .0377           | -.0022  | -.0028  | .0104   | 0.0002 |           |
| 6.21         | .249            | .0437           | -.0039  | -.0030  | .0124   | 0      |           |
| 8.29         | .356            | .0525           | -.0100  | -.0057  | .0153   | -.0014 |           |
| 10.37        | .471            | .0649           | -.0115  | -.0043  | .0152   | -.0016 |           |
| 12.43        | .590            | .0814           | -.0158  | -.0050  | .0156   | -.0020 |           |
| 14.53        | .714            | .1027           | -.0242  | -.0054  | .0155   | -.0031 |           |
| 16.62        | .831            | .1292           | -.0272  | -.0099  | .0159   | -.0023 |           |
| 18.72        | .971            | .1915           | -.0473  | -.0084  | .0187   | -.0029 |           |
| 20.74        | 1.004           | .2751           | -.0253  | .0096   | .0068   | -.0056 |           |
| $h/c = 0.10$ | $\eta_1 = 0.15$ | $\eta_0 = 1.00$ |         |         |         |        |           |
| -2.10        | -0.152          | 0.0318          | -0.0003 | -0.0096 | 0.0063  | 0.0085 |           |
| .01          | -.046           | .0291           | -.0074  | -.0100  | .0081   | 0.0083 |           |
| 2.08         | .055            | .0290           | -.0098  | -.0106  | .0104   | 0.0079 |           |
| 4.20         | .166            | .0316           | .0134   | -.0115  | .0133   | 0.0073 |           |
| 6.23         | .277            | .0377           | .0144   | -.0130  | .0148   | 0.0071 |           |
| 8.31         | .390            | .0476           | .0127   | -.0134  | .0157   | 0.0072 |           |
| 10.39        | .509            | .0614           | .0072   | -.0164  | .0168   | 0.0066 |           |
| 12.57        | .642            | .0796           | .0033   | -.0173  | .0172   | 0.0066 |           |
| 14.57        | .761            | .1006           | -.0004  | -.0180  | .0164   | 0.0064 |           |
| 16.66        | .888            | .1284           | -.0056  | -.0180  | .0174   | 0.0054 |           |
| 18.75        | 1.026           | .2093           | -.0313  | .0009   | .0040   | -.0018 |           |
| 20.77        | 1.042           | .2921           | -.0172  | .0021   | .0013   | -.0017 |           |

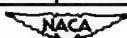


TABLE X.- AERODYNAMIC CHARACTERISTICS OF MODEL 2 WITH MODIFIED  
LEADING EDGE AND VERTICAL TAIL REMOVED - Continued  
(b)  $x_s/c = 0.60$ ;  $h/c = 0.10$

| $\alpha$                                     | $C_L$  | $C_D$  | $C_m$   | $C_y$   | $C_l$  | $C_n$  | $\alpha$ | $C_L$  | $C_D$  | $C_m$   | $C_y$   | $C_l$   | $C_n$  |
|--|--------|--------|---------|---------|--------|--------|----------|--------|--------|---------|---------|---------|--------|
| $h/c = 0.10$ $\eta_1 = 0.15$ $\eta_0 = 0.40$ |        |        |         |         |        |        |          |        |        |         |         |         |        |
| -2.07  | -0.153 | 0.0315 | -0.0171 | -0.0048 | 0.0044 | 0.0016 | -2.09    | -0.180 | 0.0413 | -0.0194 | -0.0084 | 0.0100  | 0.0038 |
| 0  | -.051  | .0305  | -.0164  | -.0043  | .0045  | .0012  | -.02     | -.081  | .0394  | -.0113  | -.0099  | .0120   | .0045  |
| 2.08   | .055   | .0368  | -.0138  | -.0050  | .0063  | .0007  | 2.14     | .017   | .0406  | -.0109  | -.0107  | .0140   | .0043  |
| 4.15   | .160   | .0407  | -.0148  | -.0055  | .0084  | .0008  | 4.13     | .123   | .0441  | -.0095  | -.0123  | .0159   | .0039  |
| 6.23   | .296   | .0474  | -.0172  | -.0062  | .0105  | .0002  | 6.20     | .233   | .0500  | -.0060  | -.0140  | .0179   | .0036  |
| 8.30   | .377   | .0568  | -.0173  | -.0073  | .0116  | .0005  | 8.27     | .338   | .0602  | -.0094  | -.0156  | .0205   | .0029  |
| 10.38  | .489   | .0705  | -.0217  | -.0085  | .0125  | -.0002 | 10.35    | .445   | .0716  | -.0111  | -.0176  | .0232   | .0021  |
| 12.46  | .598   | .0866  | -.0264  | -.0091  | .0142  | -.0016 | 12.43    | .564   | .0887  | -.0137  | -.0194  | .0238   | .0014  |
| 14.58  | .722   | .1080  | -.0433  | -.0110  | .0147  | -.0014 | 14.51    | .676   | .1097  | -.0189  | -.0218  | .0247   | .0011  |
| 16.62  | .840   | .1379  | -.0395  | -.0175  | .0150  | -.0008 | 16.70    | .809   | .1409  | -.0246  | -.0269  | .0247   | .0025  |
| 18.71  | .968   | .2086  | -.0516  | -.0063  | .0086  | -.0042 | 18.69    | .933   | .1989  | -.0391  | -.0208  | .0256   | -.0029 |
| 20.74  | 1.002  | .2837  | -.0243  | .0051   | .0050  | -.0054 | 20.71    | .958   | .2745  | -.0064  | -.0025  | .0174   | -.0060 |
| $h/c = 0.10$ $\eta_1 = 0.15$ $\eta_0 = 0.80$ |        |        |         |         |        |        |          |        |        |         |         |         |        |
| -2.09  | -0.194 | 0.0501 | -0.0137 | -0.0108 | 0.0159 | 0.0071 | -2.10    | -0.194 | 0.0568 | -0.0107 | -0.0132 | 0.0184  | 0.0097 |
| -.03   | -.097  | .0485  | -.0076  | -.0132  | .0172  | .0070  | -.03     | -.104  | .0547  | -.0058  | -.0158  | .0207   | .0101  |
| 2.04   | .002   | .0493  | -.0069  | -.0147  | .0186  | .0070  | 2.03     | -.009  | .0552  | -.0070  | -.0187  | .0236   | .0101  |
| 4.11   | .100   | .0512  | -.0035  | -.0177  | .0231  | .0066  | 4.10     | .088   | .0571  | -.0026  | -.0212  | .0268   | .0100  |
| 6.18   | .202   | .0565  | -.0045  | -.0197  | .0258  | .0064  | 6.18     | .199   | .0631  | -.0037  | -.0251  | .0295   | .0098  |
| 8.25   | .308   | .0651  | -.0045  | -.0213  | .0282  | .0056  | 8.25     | .304   | .0702  | -.0036  | -.0277  | .0335   | .0092  |
| 10.33  | .414   | .0757  | -.0047  | -.0240  | .0306  | .0047  | 10.33    | .410   | .0806  | -.0043  | -.0307  | .0367   | .0077  |
| 12.42  | .544   | .0924  | -.0049  | -.0280  | .0330  | .0037  | 12.41    | .531   | .0970  | -.0009  | -.0344  | .0385   | .0069  |
| 14.50  | .658   | .1129  | -.0119  | -.0290  | .0301  | .0033  | 14.49    | .650   | .1156  | -.0062  | -.0372  | .0403   | .0043  |
| 16.59  | .784   | .1418  | -.0221  | -.0336  | .0298  | .0039  | 16.58    | .782   | .1447  | -.0169  | -.0378  | .0347   | .0046  |
| 18.68  | .918   | .2013  | -.0327  | -.0302  | .0379  | -.0003 | 18.68    | .915   | .1973  | -.0305  | -.0312  | .0384   | -.0010 |
| 20.71  | .960   | .2763  | -.0144  | -.0041  | .0190  | -.0064 | 20.71    | .963   | .2785  | -.0192  | -.0035  | .0230   | -.0078 |
| $h/c = 0.10$ $\eta_1 = 0.40$ $\eta_0 = 1.00$ |        |        |         |         |        |        |          |        |        |         |         |         |        |
| -2.06  | -0.150 | 0.0440 | -0.0125 | -0.0166 | 0.0053 | 0.0112 | -2.05    | -0.126 | 0.0328 | -0.0115 | -0.0106 | -0.0005 | 0.0088 |
| .01  | -.039  | .0421  | -.0044  | -.0174  | .0097  | .0115  | -.03     | -.021  | .0310  | -.0058  | -.0112  | .0018   | .0091  |
| 2.08   | .055   | .0434  | -.0025  | -.0181  | .0101  | .0112  | 2.09     | .079   | .0313  | -.0008  | -.0116  | .0044   | .0088  |
| 4.15   | .152   | .0454  | -.0002  | -.0196  | .0148  | .0107  | 4.17     | .182   | .0343  | -.0015  | -.0130  | .0078   | .0084  |
| 6.22   | .261   | .0514  | .0042   | -.0226  | .0180  | .0104  | 6.24     | .292   | .0408  | -.0058  | -.0138  | .0100   | .0080  |
| 8.30   | .375   | .0609  | .0066   | -.0256  | .0222  | .0103  | 8.32     | .407   | .0513  | -.0028  | -.0176  | .0133   | .0080  |
| 10.38  | .482   | .0735  | .0023   | -.0274  | .0246  | .0099  | 10.40    | .523   | .0656  | -.0009  | -.0194  | .0141   | .0081  |
| 12.47  | .611   | .0914  | .0014   | -.0299  | .0257  | .0093  | 12.49    | .652   | .0836  | -.0045  | -.0204  | .0145   | .0081  |
| 14.55  | .728   | .1113  | .0010   | -.0347  | .0285  | .0094  | 14.58    | .772   | .1055  | -.0085  | -.0222  | .0146   | .0085  |
| 16.63  | .854   | .1409  | -.0148  | -.0336  | .0260  | .0093  | 16.69    | .898   | .1353  | -.0169  | -.0195  | .0155   | .0067  |
| 18.72  | .978   | .2080  | -.0248  | -.0106  | .0189  | -.0002 | 18.76    | 1.034  | .2059  | -.0189  | .0023   | .0054   | -.0018 |
| 20.77  | 1.049  | .2949  | -.0227  | .0062   | .0021  | -.0030 | 20.77    | 1.047  | .2962  | -.0252  | .0014   | .0007   | -.0032 |
| $h/c = 0.10$ $\eta_1 = 0.60$ $\eta_0 = 1.00$ |        |        |         |         |        |        |          |        |        |         |         |         |        |

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TABLE X. - AERODYNAMIC CHARACTERISTICS OF MODEL 2 WITH MODIFIED  
LEADING EDGE AND VERTICAL TAIL REMOVED - Concluded  
(c)  $x_s/c = 0.80$ ;  $h/c = 0.10$

| $\alpha$   | $C_L$  | $C_D$  | $C_m$  | $C_Y$   | $C_l$  | $C_n$  | $\alpha$ | $C_L$  | $C_D$  | $C_m$   | $C_Y$   | $C_l$  | $C_n$  |
|--|--------|--------|--------|---------|--------|--------|----------|--------|--------|---------|---------|--------|--------|
| $h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.40$ |        |        |        |         |        |        |          |        |        |         |         |        |        |
| -2.10  | -0.206 | 0.0319 | 0.0079 | -0.0018 | 0.0109 | 0.0015 | -2.14    | -0.257 | 0.0412 | 0.0121  | -0.0050 | 0.0177 | 0.0042 |
| .03  | -.101  | .0284  | .0090  | 0       | .0115  | .0001  | -.06     | -.145  | .0368  | .0162   | -.0051  | .0196  | .0035  |
| 2.04   | .006   | .0281  | .0098  | -.0003  | .0111  | -.0001 | 2.01     | -.036  | .0355  | .0191   | -.0038  | .0198  | .0022  |
| 4.12   | .114   | .0309  | .0076  | -.0008  | .0132  | -.0008 | 4.09     | .073   | .0371  | .0158   | -.0058  | .0201  | .0020  |
| 6.20   | .228   | .0364  | .0116  | .0004   | .0133  | -.0012 | 6.17     | .190   | .0416  | .0190   | -.0064  | .0220  | .0012  |
| 8.28   | .344   | .0457  | .0096  | .0014   | .0129  | -.0025 | 8.25     | .303   | .0498  | .0164   | -.0062  | .0231  | .0004  |
| 10.36  | .466   | .0592  | .0043  | -.0008  | .0145  | -.0028 | 10.34    | .425   | .0619  | .0118   | -.0056  | .0224  | -.0012 |
| 12.45  | .588   | .0757  | .0002  | -.0009  | .0147  | -.0035 | 12.42    | .540   | .0769  | .0091   | -.0066  | .0234  | -.0017 |
| 14.53  | .699   | .0956  | -.0060 | -.0024  | .0158  | -.0041 | 14.50    | .659   | .0955  | .0023   | -.0083  | .0249  | -.0030 |
| 16.61  | .823   | .1210  | -.0068 | -.0038  | .0168  | -.0046 | 16.59    | .784   | .1203  | .0035   | -.0187  | .0339  | -.0046 |
| 18.70  | .949   | .1902  | -.0260 | .0088   | .0091  | -.0083 | 18.69    | .930   | .1786  | -.0204  | -.0066  | .0245  | -.0059 |
| 20.74  | 1.003  | .2755  | -.0154 | .0192   | -.0012 | -.0086 | 20.71    | .962   | .2685  | -.0042  | -.0089  | .0116  | -.0075 |
| $h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 1.00$ |        |        |        |         |        |        |          |        |        |         |         |        |        |
| -2.15  | -0.276 | 0.0565 | 0.0329 | -0.0087 | 0.0295 | 0.0105 | -2.11    | -0.210 | 0.0416 | 0.0246  | -0.0118 | 0.0213 | 0.0108 |
| -.07   | -.165  | .0517  | .0376  | -.0101  | .0306  | .0098  | -.04     | -.110  | .0374  | .0280   | -.0131  | .0210  | .0104  |
| 1.99   | -.076  | .0489  | .0365  | -.0119  | .0313  | .0091  | 2.04     | -.004  | .0362  | .0302   | -.0140  | .0223  | .0098  |
| 4.07   | .043   | .0494  | .0386  | -.0138  | .0331  | .0081  | 4.12     | .108   | .0378  | .0336   | -.0153  | .0236  | .0090  |
| 6.14   | .148   | .0521  | .0372  | -.0145  | .0362  | .0069  | 6.19     | .217   | .0427  | .0334   | -.0163  | .0250  | .0087  |
| 8.22   | .260   | .0585  | .0379  | -.0166  | .0380  | .0057  | 8.27     | .333   | .0504  | .0320   | -.0175  | .0272  | .0071  |
| 10.30  | .378   | .0697  | .0305  | -.0181  | .0386  | .0048  | 10.36    | .454   | .0626  | .0277   | -.0189  | .0283  | .0068  |
| 12.38  | .495   | .0814  | .0285  | -.0189  | .0388  | .0029  | 12.44    | .576   | .0785  | .0224   | -.0199  | .0278  | .0056  |
| 14.47  | .621   | .1015  | .0211  | -.0182  | .0357  | .0019  | 14.53    | .704   | .0974  | .0162   | -.0202  | .0274  | .0047  |
| 16.56  | .745   | .1209  | .0202  | -.0194  | .0355  | 0      | 16.62    | .828   | .1225  | .0128   | -.0197  | .0264  | .0032  |
| 18.67  | .904   | .1869  | -.0116 | -.0149  | .0325  | -.0031 | 18.72    | .975   | .2009  | -.0148  | -.0129  | .0182  | .0008  |
| 20.70  | .955   | .2732  | -.0033 | .0074   | .0116  | -.0074 | 20.76    | 1.042  | .2965  | -.0182  | .0053   | .0015  | -.0018 |
| $h/c = 0.10 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$ |        |        |        |         |        |        |          |        |        |         |         |        |        |
| -2.08  | -0.172 | 0.0306 | 0.0142 | -0.0081 | 0.0119 | 0.0078 | -2.06    | -0.144 | 0.0217 | -0.0042 | -0.0042 | 0.0053 | 0.0044 |
| -.01   | -.065  | .0275  | .0186  | -.0083  | .0118  | .0076  | -.02     | -.034  | .0189  | .0115   | -.0044  | .0043  | .0041  |
| 2.07   | .046   | .0268  | .0210  | -.0086  | .0137  | .0069  | 2.09     | .072   | .0195  | .0116   | -.0045  | .0061  | .0036  |
| 4.15   | .153   | .0298  | .0224  | -.0092  | .0142  | .0066  | 4.17     | .186   | .0228  | .0121   | -.0053  | .0071  | .0037  |
| 6.23   | .267   | .0357  | .0233  | -.0106  | .0157  | .0065  | 6.25     | .296   | .0300  | .0092   | -.0054  | .0070  | .0034  |
| 8.31   | .382   | .0451  | .0211  | -.0126  | .0177  | .0059  | 8.33     | .417   | .0406  | .0071   | -.0062  | .0075  | .0035  |
| 10.39  | .504   | .0586  | .0183  | -.0132  | .0178  | .0062  | 10.42    | .541   | .0555  | .0023   | -.0063  | .0071  | .0035  |
| 12.48  | .628   | .0761  | .0080  | -.0146  | .0178  | .0052  | 12.50    | .668   | .0748  | -.0051  | -.0092  | .0083  | .0036  |
| 14.56  | .753   | .0969  | .0033  | -.0130  | .0173  | .0044  | 14.59    | .793   | .0968  | -.0076  | -.0072  | .0065  | .0033  |
| 16.65  | .872   | .1234  | .0005  | -.0155  | .0169  | .0044  | 16.68    | .922   | .1276  | -.0158  | -.0103  | .0026  | .0047  |
| 18.75  | 1.024  | .2085  | -.0318 | -.0065  | .0060  | -.0006 | 18.75    | 1.026  | .2069  | -.0303  | -.0039  | .0054  | -.0004 |
| 20.77  | 1.049  | .2963  | -.0186 | -.0013  | .0008  | -.0013 | 20.77    | 1.047  | .2947  | -.0168  | -.0003  | .0014  | -.0005 |
| $h/c = 0.10 \quad \eta_1 = 0.80 \quad \eta_0 = 1.00$ |        |        |        |         |        |        |          |        |        |         |         |        |        |


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TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3  
(a)  $x_s/c = 0.70$ ;  $h/c = 0$  and  $0.05$

| $\alpha$  | $C_L$  | $C_D$  | $C_m$  | $C_Y$  | $C_l$  | $C_n$  |
|-----------|--------|--------|--------|--------|--------|--------|
| $h/c = 0$ |        |        |        |        |        |        |
| -2.03     | -0.103 | 0.0127 | 0.0233 | 0.0001 | 0.0019 | 0.0001 |
| .04       | -.002  | .0109  | .0138  | -.0004 | .0022  | .0004  |
| 2.11      | .099   | .0123  | .0013  | -.0008 | .0016  | .0004  |
| 4.18      | .198   | .0163  | -.0071 | -.0016 | .0021  | .0005  |
| 6.25      | .300   | .0237  | -.0193 | -.0029 | .0021  | .0013  |
| 8.32      | .403   | .0368  | -.0294 | -.0013 | .0015  | .0003  |
| 10.39     | .497   | .0576  | -.0422 | -.0013 | .0020  | .0002  |
| 12.46     | .602   | .0910  | -.0492 | .0001  | .0015  | -.0004 |
| 14.53     | .702   | .1358  | -.0570 | .0001  | .0015  | -.0007 |
| 16.60     | .792   | .1906  | -.0645 | -.0018 | .0015  | .0001  |
| 18.66     | .881   | .2532  | -.0690 | -.0014 | .0010  | .0001  |
| 20.71     | .958   | .3208  | -.0834 | -.0011 | .0021  | -.0006 |

| $\alpha$     | $C_L$  | $C_D$  | $C_m$  | $C_Y$  | $C_l$  | $C_n$   |
|--------------|--------|--------|--------|--------|--------|---------|
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.099 | 0.0150 | 0.0189 | 0.0024 | 0.0025 | -0.0012 |
| .04          | .004   | .0137  | .0082  | .0020  | .0015  | -0.0012 |
| 2.11         | .107   | .0152  | -.0051 | .0008  | .0022  | -.0005  |
| 4.18         | .204   | .0195  | -.0160 | .0008  | .0022  | -.0007  |
| 6.25         | .298   | .0271  | -.0268 | -.0009 | .0021  | -.0001  |
| 8.32         | .402   | .0408  | -.0361 | -.0009 | .0015  | -.0004  |
| 10.39        | .497   | .0608  | -.0473 | -.0004 | .0019  | -.0005  |
| 12.46        | .600   | .0944  | -.0575 | -.0010 | .0022  | -.0006  |
| 14.53        | .704   | .1394  | -.0655 | -.0005 | .0023  | -.0010  |
| 16.60        | .800   | .1942  | -.0719 | -.0001 | .0009  | -.0006  |
| 18.66        | .883   | .2574  | -.0771 | -.0001 | -.0004 | -.0006  |
| 20.72        | .974   | .3264  | -.0846 | -.0008 | -.0002 | -.0001  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.112 | 0.0217 | 0.0122 | 0.0040 | 0.0014 | -0.0014 |
| .04          | .03    | -.017  | .0203  | .0026  | .0025  | .0030   |
| 2.10         | .086   | .0218  | -.0052 | .0013  | .0030  | .0001   |
| 4.16         | .176   | .0253  | -.0170 | -.0006 | .0039  | .0008   |
| 6.23         | .273   | .0327  | -.0294 | -.0010 | .0040  | .0005   |
| 8.30         | .374   | .0450  | -.0381 | -.0023 | .0044  | .0010   |
| 10.37        | .465   | .0633  | -.0465 | -.0016 | .0049  | .0001   |
| 12.44        | .566   | .0942  | -.0557 | -.0003 | .0046  | -.0008  |
| 14.51        | .676   | .1373  | -.0630 | -.0022 | .0025  | -.0013  |
| 16.58        | .767   | .1890  | -.0698 | -.0017 | .0013  | -.0012  |
| 18.64        | .863   | .2557  | -.0771 | -.0010 | .0016  | -.0011  |
| 20.71        | .956   | .3271  | -.0862 | 0      | .0052  | -.0025  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.127 | 0.0277 | 0.0179 | 0.0009 | 0.0052 | 0.0013  |
| .04          | -.031  | .0260  | -.0076 | -.0010 | .0072  | .0021   |
| 2.08         | .064   | .0266  | -.0006 | -.0018 | .0073  | .0020   |
| 4.15         | .156   | .0297  | -.0110 | -.0026 | .0085  | .0021   |
| 6.22         | .259   | .0359  | -.0229 | -.0044 | .0084  | .0024   |
| 8.29         | .352   | .0472  | -.0314 | -.0046 | .0099  | .0017   |
| 10.35        | .449   | .0642  | -.0405 | -.0026 | .0087  | 0       |
| 12.43        | .532   | .0937  | -.0498 | -.0010 | .0076  | -.0015  |
| 14.50        | .652   | .1358  | -.0591 | -.0019 | .0063  | -.0025  |
| 16.57        | .753   | .1893  | -.0631 | -.0007 | .0073  | -.0031  |
| 18.64        | .851   | .2552  | -.0736 | -.0004 | .0053  | -.0028  |
| 20.70        | .946   | .3255  | -.0829 | -.0022 | .0056  | -.0042  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.144 | 0.0306 | 0.0215 | 0.0003 | 0.0100 | 0.0024  |
| .04          | -.049  | .0285  | .0146  | -.0021 | .0109  | .0036   |
| 2.07         | .042   | .0286  | -.0051 | -.0041 | .0125  | .0038   |
| 4.14         | .141   | .0316  | -.0033 | -.0048 | .0131  | .0036   |
| 6.21         | .240   | .0375  | -.0153 | -.0063 | .0142  | .0033   |
| 8.28         | .336   | .0477  | -.0243 | -.0058 | .0141  | .0022   |
| 10.35        | .437   | .0644  | -.0333 | -.0032 | .0138  | 0       |
| 12.42        | .540   | .0951  | -.0467 | -.0013 | .0114  | -.0011  |
| 14.49        | .648   | .1368  | -.0570 | -.0009 | .0090  | -.0022  |
| 16.57        | .755   | .1906  | -.0661 | -.0003 | .0066  | -.0028  |
| 18.64        | .858   | .2557  | -.0727 | -.0017 | .0036  | -.0037  |
| 20.70        | .946   | .3250  | -.0857 | -.0031 | .0033  | -.0039  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.137 | 0.0296 | 0.0252 | -.0013 | 0.0096 | 00.0030 |
| .04          | -.040  | .0278  | .0182  | -.0039 | .0116  | .0042   |
| 2.07         | .049   | .0284  | .0105  | -.0044 | .0131  | .0035   |
| 4.14         | .148   | .0316  | .0015  | -.0060 | .0153  | .0037   |
| 6.21         | .244   | .0373  | -.0108 | -.0081 | .0152  | .0038   |
| 8.28         | .346   | .0476  | -.0211 | -.0092 | .0156  | .0029   |
| 10.35        | .445   | .0643  | -.0317 | -.0055 | .0135  | .0007   |
| 12.43        | .555   | .0954  | -.0453 | -.0044 | .0111  | -.0002  |
| 14.51        | .667   | .1391  | -.0556 | -.0011 | .0069  | -.0022  |
| 16.58        | .774   | .1948  | -.0673 | -.0025 | .0056  | -.0013  |
| 18.65        | .876   | .2610  | -.0732 | -.0025 | .0057  | -.0021  |
| 20.71        | .953   | .3266  | -.0798 | -.0011 | .0047  | -.0022  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.120 | 0.0200 | 0.0150 | 0.0003 | 0.0060 | 00.0020 |
| .04          | -.033  | .0188  | .0126  | 0      | .0109  | .0038   |
| 2.07         | .036   | .0299  | .0102  | -.0038 | .0144  | .0036   |
| 4.14         | .138   | .0322  | .0002  | -.0048 | .0164  | .0035   |
| 6.20         | .231   | .0378  | -.0104 | -.0071 | .0170  | .0033   |
| 8.27         | .334   | .0486  | -.0215 | -.0056 | .0147  | .0019   |
| 10.34        | .428   | .0642  | -.0313 | -.0042 | .0136  | .0007   |
| 12.42        | .536   | .0935  | -.0446 | -.0017 | .0117  | -.0010  |
| 14.49        | .649   | .1365  | -.0544 | -.0007 | .0087  | -.0022  |
| 16.56        | .748   | .1876  | -.0632 | -.0001 | .0068  | -.0029  |
| 18.64        | .855   | .2559  | -.0748 | -.0007 | .0041  | -.0032  |
| 20.70        | .948   | .3267  | -.0859 | -.0022 | .0052  | -.0031  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.137 | 0.0316 | 0.0239 | 0.0003 | 0.0112 | 0.0026  |
| .04          | -.054  | .0293  | .0188  | -.0003 | .0126  | .0026   |
| 2.07         | .036   | .0299  | .0102  | -.0038 | .0144  | .0036   |
| 4.14         | .138   | .0322  | .0002  | -.0048 | .0164  | .0035   |
| 6.20         | .231   | .0378  | -.0104 | -.0071 | .0170  | .0033   |
| 8.27         | .334   | .0486  | -.0215 | -.0056 | .0147  | .0019   |
| 10.34        | .428   | .0642  | -.0313 | -.0042 | .0136  | .0007   |
| 12.42        | .536   | .0935  | -.0446 | -.0017 | .0117  | -.0010  |
| 14.49        | .649   | .1365  | -.0544 | -.0007 | .0087  | -.0022  |
| 16.56        | .748   | .1876  | -.0632 | -.0001 | .0068  | -.0029  |
| 18.64        | .855   | .2559  | -.0748 | -.0007 | .0041  | -.0032  |
| 20.70        | .948   | .3267  | -.0859 | -.0022 | .0052  | -.0031  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.137 | 0.0316 | 0.0239 | 0.0003 | 0.0112 | 0.0026  |
| .04          | -.054  | .0293  | .0188  | -.0003 | .0126  | .0026   |
| 2.07         | .036   | .0299  | .0102  | -.0038 | .0144  | .0036   |
| 4.14         | .138   | .0322  | .0002  | -.0048 | .0164  | .0035   |
| 6.20         | .231   | .0378  | -.0104 | -.0071 | .0170  | .0033   |
| 8.27         | .334   | .0486  | -.0215 | -.0056 | .0147  | .0019   |
| 10.34        | .428   | .0642  | -.0313 | -.0042 | .0136  | .0007   |
| 12.42        | .536   | .0935  | -.0446 | -.0017 | .0117  | -.0010  |
| 14.49        | .649   | .1365  | -.0544 | -.0007 | .0087  | -.0022  |
| 16.56        | .748   | .1876  | -.0632 | -.0001 | .0068  | -.0029  |
| 18.64        | .855   | .2559  | -.0748 | -.0007 | .0041  | -.0032  |
| 20.70        | .948   | .3267  | -.0859 | -.0022 | .0052  | -.0031  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.137 | 0.0316 | 0.0239 | 0.0003 | 0.0112 | 0.0026  |
| .04          | -.054  | .0293  | .0188  | -.0003 | .0126  | .0026   |
| 2.07         | .036   | .0299  | .0102  | -.0038 | .0144  | .0036   |
| 4.14         | .138   | .0322  | .0002  | -.0048 | .0164  | .0035   |
| 6.20         | .231   | .0378  | -.0104 | -.0071 | .0170  | .0033   |
| 8.27         | .334   | .0486  | -.0215 | -.0056 | .0147  | .0019   |
| 10.34        | .428   | .0642  | -.0313 | -.0042 | .0136  | .0007   |
| 12.42        | .536   | .0935  | -.0446 | -.0017 | .0117  | -.0010  |
| 14.49        | .649   | .1365  | -.0544 | -.0007 | .0087  | -.0022  |
| 16.56        | .748   | .1876  | -.0632 | -.0001 | .0068  | -.0029  |
| 18.64        | .855   | .2559  | -.0748 | -.0007 | .0041  | -.0032  |
| 20.70        | .948   | .3267  | -.0859 | -.0022 | .0052  | -.0031  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.137 | 0.0316 | 0.0239 | 0.0003 | 0.0112 | 0.0026  |
| .04          | -.054  | .0293  | .0188  | -.0003 | .0126  | .0026   |
| 2.07         | .036   | .0299  | .0102  | -.0038 | .0144  | .0036   |
| 4.14         | .138   | .0322  | .0002  | -.0048 | .0164  | .0035   |
| 6.20         | .231   | .0378  | -.0104 | -.0071 | .0170  | .0033   |
| 8.27         | .334   | .0486  | -.0215 | -.0056 | .0147  | .0019   |
| 10.34        | .428   | .0642  | -.0313 | -.0042 | .0136  | .0007   |
| 12.42        | .536   | .0935  | -.0446 | -.0017 | .0117  | -.0010  |
| 14.49        | .649   | .1365  | -.0544 | -.0007 | .0087  | -.0022  |
| 16.56        | .748   | .1876  | -.0632 | -.0001 | .0068  | -.0029  |
| 18.64        | .855   | .2559  | -.0748 | -.0007 | .0041  | -.0032  |
| 20.70        | .948   | .3267  | -.0859 | -.0022 | .0052  | -.0031  |
| $h/c = 0.05$ |        |        |        |        |        |         |
| -2.03        | -0.137 | 0.0316 | 0.0239 | 0.0003 | 0.0112 | 0.0026  |
| .04          | -.054  | .0293  | .0188  | -.0003 | .0126  | .0026   |
| 2.07         | .036   | .0299  | .0102  | -.0038 | .0144  | .0036   |
| 4.14         | .138   | .0322  | .0002  | -.0048 | .0164  | .0035   |
| 6.20         | .231   | .0378  | -.0104 | -.0071 | .0170  | .0033   |
| 8.27         | .334   | .0486  | -.0215 | -.0056 | .0147  | .0019   |
| 10.34        | .428   | .0642  | -.0313 | -.0042 | .0136  | .0007   |
| 12.42        | .536   | .0935  | -.0446 | -.0017 | .0117  | -.0010  |
| 14.49        | .649   | .1365  | -.0544 | -.0007 | .0087  | -.0022  |
| 16.56        | .748   | .1876  | -.0632 | -.0001 | .0068  | -.0029  |
| 18.64        | .855   | .2559  | -.0748 | -.0007 | .0041  | -.0032  |
| 20.70        | .948   | .3267  | -.085  |        |        |         |

TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3 - Continued  
 (b)  $x_s/c = 0.70$ ;  $h/c = 0.05$  and  $0.10$

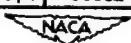


TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3 - Continued  
 (c)  $x_s/c = 0.70$ ;  $h/c = 0.10$

The NACA logo, which consists of the letters "NACA" in a bold, serif font, enclosed within a stylized, symmetrical wing-like frame.

TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3 - Continued  
 (d)  $x_B/c = 0.70$ ;  $h/c = 0.10$  and  $0.15$

| $\alpha$     | $C_L$  | $C_D$           | $C_m$  | $C_Y$           | $C_l$  | $C_n$   | $\alpha$ | $C_L$        | $C_D$  | $C_m$           | $C_Y$   | $C_l$           | $C_n$  |
|--------------|--------|-----------------|--------|-----------------|--------|---------|----------|--------------|--------|-----------------|---------|-----------------|--------|
| $h/c = 0.10$ |        | $\eta_1 = 0.40$ |        | $\eta_0 = 0.60$ |        |         |          | $h/c = 0.10$ |        | $\eta_1 = 0.40$ |         | $\eta_0 = 0.80$ |        |
| -2.06        | -0.136 | 0.0253          | 0.0300 | -0.0061         | 0.0065 | 0.0057  | -2.07    | -0.156       | 0.0305 | 0.0353          | -0.0063 | 0.0100          | 0.0067 |
| .01          | -.045  | .0234           | .0222  | -.0051          | .0074  | .0046   | 0        | -.055        | .0277  | .0259           | -.0082  | .0129           | .0074  |
| 2.08         | .051   | .0241           | .0127  | -.0072          | .0089  | .0049   | 2.06     | .033         | .0282  | .0181           | -.0096  | .0143           | .0077  |
| 4.15         | .153   | .0277           | .0018  | -.0087          | .0101  | .0054   | 4.13     | .135         | .0311  | .0100           | -.0111  | .0160           | .0074  |
| 6.21         | .248   | .0338           | -.0086 | -.0091          | .0107  | .0049   | 6.20     | .231         | .0367  | -.0009          | -.0113  | .0164           | .0061  |
| 8.28         | .345   | .0448           | -.0199 | -.0097          | .0116  | .0041   | 8.27     | .330         | .0469  | -.0118          | -.0145  | .0179           | .0060  |
| 10.35        | .444   | .0624           | -.0295 | -.0084          | .0114  | .0028   | 10.34    | .432         | .0635  | -.0219          | -.0095  | .0160           | .0038  |
| 12.42        | .549   | .0914           | -.0382 | -.0071          | .0101  | .0012   | 12.42    | .537         | .0930  | -.0339          | -.0078  | .0153           | .0016  |
| 14.50        | .658   | .1378           | -.0479 | -.0061          | .0096  | .0016   | 14.50    | .660         | .1389  | -.0483          | -.0060  | .0121           | .0005  |
| 16.58        | .770   | .1915           | -.0616 | -.0044          | .0065  | -.0006  | 16.58    | .778         | .1930  | -.0618          | -.0047  | .0079           | -.0012 |
| 18.64        | .863   | .2504           | -.0681 | -.0034          | .0036  | -.0007  | 18.65    | .871         | .2517  | -.0679          | -.0023  | .0053           | -.0015 |
| 20.70        | .946   | .3191           | -.0821 | .0005           | .0036  | -.0028  | 20.70    | .946         | .3175  | -.0816          | -.0001  | .0031           | -.0016 |
| $h/c = 0.15$ |        | $\eta_1 = 0.15$ |        | $\eta_0 = 0.20$ |        |         |          | $h/c = 0.15$ |        | $\eta_1 = 0.15$ |         | $\eta_0 = 0.40$ |        |
| -2.04        | -0.113 | 0.0222          | 0.0162 | 0.0018          | 0.0018 | -0.0018 | -2.10    | -0.194       | 0.0458 | 0.0306          | -0.0001 | 0.0081          | 0.0020 |
| .04          | -.001  | .0210           | .0050  | .0017           | .0015  | -.0016  | -.03     | -.094        | .0437  | .0186           | -.0008  | .0096           | .0014  |
| 2.10         | .091   | .0226           | -.0050 | -.0004          | .0016  | -.0006  | 2.04     | 0            | .0451  | .0072           | -0.0035 | .0121           | .0017  |
| 4.17         | .186   | .0270           | -.0136 | -.0008          | .0018  | -.0007  | 4.11     | .095         | .0475  | .0028           | -.0046  | .0146           | .0007  |
| 6.24         | .286   | .0343           | -.0245 | -.0027          | .0023  | .0003   | 6.17     | .189         | .0531  | -.0152          | -.0060  | .0151           | .0004  |
| 8.31         | .381   | .0465           | -.0346 | -.0041          | .0039  | .0007   | 8.24     | .289         | .0632  | -.0268          | -.0047  | .0157           | -.0017 |
| 10.37        | .478   | .0659           | -.0445 | -.0037          | .0035  | -.0001  | 10.31    | .382         | .0804  | -.0358          | -.0026  | .0146           | -.0041 |
| 12.45        | .582   | .0974           | -.0538 | -.0027          | .0030  | -.0007  | 12.38    | .484         | .1069  | -.0452          | -.0006  | .0148           | -.0076 |
| 14.52        | .684   | .1412           | -.0617 | -.0018          | .0029  | -.0006  | 14.45    | .582         | .1451  | -.0556          | -.0030  | .0125           | -.0090 |
| 16.59        | .783   | .1955           | -.0692 | -.0027          | .0021  | -.0004  | 16.52    | .690         | .1941  | -.0648          | -.0048  | .0099           | -.0102 |
| 18.65        | .876   | .2615           | -.0800 | -.0029          | -.0010 | .0006   | 18.58    | .777         | .2510  | -.0651          | -.0056  | -.0074          | -.0108 |
| 20.71        | .964   | .3288           | -.0859 | -.0030          | -.0034 | .0026   | 20.65    | .871         | .3215  | -.0731          | -.0070  | -.0099          | -.0116 |
| $h/c = 0.15$ |        | $\eta_1 = 0.15$ |        | $\eta_0 = 0.60$ |        |         |          | $h/c = 0.15$ |        | $\eta_1 = 0.15$ |         | $\eta_0 = 0.80$ |        |
| -2.12        | -0.225 | 0.0603          | 0.0354 | -0.0030         | 0.0172 | 0.0052  | -2.13    | -0.243       | 0.0673 | 0.0469          | -0.0046 | 0.0218          | 0.0079 |
| -.05         | -.131  | .0555           | .0320  | -.0029          | .0175  | .0046   | -.06     | -.149        | .0641  | .0368           | -.0057  | .0244           | .0076  |
| 2.01         | -.036  | .0562           | .0208  | -.0034          | .0186  | .0031   | 2.00     | -.057        | .0620  | .0266           | -.0058  | .0255           | .0058  |
| 4.08         | .050   | .0579           | .0098  | -.0044          | .0214  | .0016   | 4.06     | .032         | .0613  | .0197           | -.0074  | .0269           | .0046  |
| 6.15         | .156   | .0619           | -.0013 | -.0056          | .0232  | .0009   | 6.13     | .133         | .0661  | .0065           | -.0078  | .0291           | .0025  |
| 8.21         | .243   | .0723           | -.0150 | -.0087          | .0257  | -.0006  | 8.20     | .234         | .0728  | -.0012          | -.0089  | .0310           | -.0003 |
| 10.28        | .341   | .0894           | -.0228 | -.0090          | .0270  | -.0022  | 10.27    | .326         | .0907  | -.0171          | -.0091  | .0300           | -.0029 |
| 12.34        | .426   | .1115           | -.0266 | -.0040          | .0259  | -.0079  | 12.33    | .421         | .1130  | -.0254          | -.0060  | .0311           | -.0071 |
| 14.42        | .538   | .1486           | -.0414 | -.0016          | .0250  | -.0103  | 14.41    | .535         | .1471  | -.0369          | .0005   | .0264           | -.0109 |
| 16.48        | .631   | .1931           | -.0476 | -.0026          | .0227  | -.0127  | 16.49    | .636         | .1968  | -.0497          | -.0049  | .0223           | -.0132 |
| 18.56        | .741   | .2519           | -.0530 | -.0061          | .0184  | -.0145  | 18.57    | .750         | .2542  | -.0515          | -.0056  | .0227           | -.0153 |
| 20.62        | .828   | .3130           | -.0639 | -.0067          | .0171  | -.0155  | 20.63    | .841         | .3152  | -.0610          | -.0072  | .0178           | -.0163 |
| $h/c = 0.15$ |        | $\eta_1 = 0.15$ |        | $\eta_0 = 1.00$ |        |         |          | $h/c = 0.15$ |        | $\eta_1 = 0.20$ |         | $\eta_0 = 1.00$ |        |
| -2.14        | -0.253 | 0.0714          | 0.0504 | -.0059          | 0.0248 | 0.0103  | -2.13    | -0.238       | 0.0671 | 0.0550          | -.0119  | 0.0229          | 0.0142 |
| -.07         | -.158  | .0633           | .0437  | -.0064          | .0280  | .0088   | -.07     | -.152        | .0615  | .0484           | -.0137  | .0267           | .0139  |
| 1.99         | -.067  | .0645           | .0339  | -.0056          | .0307  | .0060   | 2.00     | -.064        | .0596  | .0410           | -.0124  | .0285           | .0117  |
| 4.06         | .024   | .0653           | .0270  | -.0076          | .0316  | .0054   | 4.06     | .026         | .0612  | .0297           | -.0139  | .0311           | .0101  |
| 6.12         | .116   | .0681           | .0149  | -.0118          | .0329  | .0053   | 6.13     | .127         | .0654  | .0176           | -.0146  | .0327           | .0082  |
| 8.19         | .215   | .0771           | .0019  | -.0113          | .0360  | .0014   | 8.20     | .226         | .0734  | .0044           | -.0147  | .0333           | .0057  |
| 10.26        | .320   | .0963           | -.0101 | -.0115          | .0345  | -.0010  | 10.27    | .330         | .0866  | -.0053          | -.0144  | .0325           | .0025  |
| 12.33        | .417   | .1125           | -.0170 | -.0048          | .0343  | -.0074  | 12.34    | .431         | .1074  | -.0147          | -.0069  | .0324           | -.0030 |
| 14.41        | .527   | .1493           | -.0384 | -.0007          | .0255  | -.0104  | 14.41    | .533         | .1402  | -.0232          | -.0030  | .0269           | -.0060 |
| 16.48        | .632   | .1968           | -.0441 | -.0013          | .0266  | -.0124  | 16.49    | .642         | .1897  | -.0339          | -.0022  | .0250           | -.0074 |
| 18.55        | .732   | .2525           | -.0494 | -.0047          | .0210  | -.0145  | 18.57    | .753         | .2476  | -.0402          | -.0019  | .0195           | -.0098 |
| 20.63        | .839   | .3157           | -.0567 | -.0066          | .0175  | -.0162  | 20.65    | .872         | .3169  | -.0644          | -.0018  | .0177           | -.0094 |

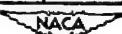


TABLE XI.-- AERODYNAMIC CHARACTERISTICS OF MODEL 3 - Concluded  
(e)  $x_s/c = 0.70$ ;  $h/c = 0.15$

| $\alpha$                                     | $c_L$  | $c_D$  | $c_m$  | $c_Y$   | $c_l$  | $c_n$  | $\alpha$ | $c_L$  | $c_D$  | $c_m$  | $c_Y$   | $c_l$  | $c_n$  |
|--|--------|--------|--------|---------|--------|--------|----------|--------|--------|--------|---------|--------|--------|
| $h/c = 0.15$ $\eta_1 = 0.40$ $\eta_0 = 1.00$ |        |        |        |         |        |        |          |        |        |        |         |        |        |
| -2.09  | -0.181 | 0.0436 | 0.0495 | -0.0115 | 0.0168 | 0.0121 | -2.06    | -0.136 | 0.0266 | 0.0373 | -0.0051 | 0.0098 | 0.0067 |
| -0.03  | -.096  | .0396  | .0436  | -.0125  | .0203  | .0122  | .01      | -.045  | .0239  | .0324  | -.0057  | .0129  | .0066  |
| 2.04   | -.007  | .0394  | .0353  | -.0163  | .0233  | .0132  | 2.07     | .047   | .0242  | .0244  | -.0079  | .0142  | .0071  |
| 4.10   | .084   | .0413  | .0270  | -.0165  | .0254  | .0120  | 4.14     | .147   | .0272  | .0145  | -.0096  | .0162  | .0073  |
| 6.17   | .186   | .0466  | .0161  | -.0184  | .0266  | .0111  | 6.21     | .246   | .0334  | .0014  | -.0100  | .0152  | .0067  |
| 8.24   | .290   | .0550  | .0060  | -.0182  | .0265  | .0089  | 8.28     | .345   | .0437  | -.0079 | -.0103  | .0158  | .0055  |
| 10.31  | .388   | .0697  | -.0055 | -.0170  | .0266  | .0062  | 10.35    | .448   | .0609  | -.0182 | -.0074  | .0154  | .0038  |
| 12.39  | .501   | .0967  | -.0181 | -.0096  | .0226  | .0022  | 12.45    | .584   | .0932  | -.0424 | -.0040  | .0063  | .0013  |
| 14.47  | .608   | .1364  | -.0301 | -.0086  | .0201  | .0012  | 14.53    | .700   | .1356  | -.0550 | 0       | .0019  | -.0015 |
| 16.58  | .770   | .1936  | -.0573 | -.0054  | .0090  | -.0013 | 16.60    | .797   | .1896  | -.0613 | -.0019  | .0010  | -.0009 |
| 18.65  | .867   | .2508  | -.0662 | -.0008  | .0041  | -.0013 | 18.66    | .874   | .2516  | -.0704 | -.0003  | .0027  | -.0012 |
| 20.71  | .962   | .3228  | -.0820 | -.0001  | .0014  | -.0010 | 20.71    | .963   | .3208  | -.0799 | -.0004  | .0016  | -.0015 |
| $h/c = 0.15$ $\eta_1 = 0.60$ $\eta_0 = 1.00$ |        |        |        |         |        |        |          |        |        |        |         |        |        |
| -2.04  | -0.109 | 0.0163 | 0.0296 | -0.0007 | 0.0043 | 0.0017 | -2.09    | -0.184 | 0.0382 | 0.0318 | -0.0058 | 0.0096 | 0.0059 |
| .03  | -.011  | .0146  | .0189  | -.0012  | .0054  | .0020  | -.02     | -.090  | .0360  | .0251  | -.0075  | .0097  | .0061  |
| 2.10   | .086   | .0156  | .0089  | -.0015  | .0062  | .0019  | 2.04     | .006   | .0365  | .0153  | -.0067  | .0122  | .0048  |
| 4.17   | .186   | .0192  | -.0016 | -.0030  | .0069  | .0022  | 4.11     | .100   | .0391  | .0037  | -.0070  | .0131  | .0041  |
| 6.24   | .281   | .0259  | -.0123 | -.0029  | .0065  | .0017  | 6.18     | .198   | .0455  | -.0076 | -.0080  | .0139  | .0032  |
| 8.32   | .394   | .0385  | -.0273 | -.0025  | .0043  | .0010  | 8.25     | .295   | .0552  | -.0188 | -.0066  | .0142  | .0015  |
| 10.39  | .503   | .0583  | -.0430 | -.0017  | .0014  | .0003  | 10.32    | .395   | .0724  | -.0300 | -.0047  | .0145  | -.0002 |
| 12.46  | .605   | .0919  | -.0505 | -.0003  | .0009  | -.0005 | 12.39    | .496   | .0995  | -.0395 | -.0043  | .0142  | -.0024 |
| 14.54  | .710   | .1370  | -.0570 | -.0008  | .0032  | -.0004 | 14.46    | .598   | .1384  | -.0455 | .0012   | .0108  | -.0049 |
| 16.60  | .793   | .1908  | -.0653 | -.0018  | .0031  | .0002  | 16.53    | .704   | .1873  | -.0514 | .0018   | .0096  | -.0055 |
| 18.66  | .887   | .2534  | -.0683 | -.0003  | 0      | -.0005 | 18.60    | .796   | .2475  | -.0576 | .0016   | .0093  | -.0054 |
| 20.72  | .967   | .3214  | -.0792 | -.0003  | 0      | 0      | 20.66    | .886   | .3201  | -.0697 | .0001   | .0117  | -.0065 |
| $h/c = 0.15$ $\eta_1 = 0.40$ $\eta_0 = 0.60$ |        |        |        |         |        |        |          |        |        |        |         |        |        |
| -2.08  | -0.166 | 0.0317 | 0.0379 | -0.0078 | 0.0108 | 0.0077 | -2.09    | -0.183 | 0.0407 | 0.0467 | -0.0113 | 0.0152 | 0.0117 |
| -.01   | -.072  | .0292  | .0317  | -.0095  | .0119  | .0079  | -.03     | -.095  | .0368  | .0386  | -.0134  | .0178  | .0122  |
| 2.05   | .021   | .0294  | .0232  | -.0116  | .0136  | .0081  | 2.04     | -.003  | .0369  | .0309  | -.0141  | .0205  | .0114  |
| 4.12   | .111   | .0326  | .0134  | -.0113  | .0115  | .0072  | 4.10     | .092   | .0390  | .0215  | -.0141  | .0212  | .0103  |
| 6.19   | .211   | .0382  | .0040  | -.0142  | .0168  | .0078  | 6.17     | .190   | .0438  | .0104  | -.0179  | .0239  | .0102  |
| 8.26   | .319   | .0493  | -.0078 | -.0134  | .0173  | .0060  | 8.24     | .292   | .0536  | .0014  | -.0174  | .0231  | .0068  |
| 10.33  | .410   | .0663  | -.0183 | -.0134  | .0180  | .0048  | 10.31    | .390   | .0696  | -.0109 | -.0167  | .0244  | .0067  |
| 12.41  | .522   | .0951  | -.0302 | -.0086  | .0160  | .0021  | 12.38    | .488   | .0947  | -.0227 | -.0127  | .0227  | .0035  |
| 14.48  | .624   | .1362  | -.0386 | -.0064  | .0140  | .0013  | 14.47    | .614   | .1371  | -.0328 | -.0094  | .0197  | .0008  |
| 16.57  | .756   | .1910  | -.0587 | -.0076  | .0090  | -.0008 | 16.58    | .766   | .1923  | -.0598 | -.0065  | .0085  | -.0008 |
| 18.65  | .869   | .2526  | -.0678 | -.0020  | .0062  | -.0028 | 18.65    | .870   | .2528  | -.0684 | -.0023  | .0061  | -.0013 |
| 20.70  | .946   | .3170  | -.0794 | -.0007  | .0034  | -.0014 | 20.70    | .941   | .3186  | -.0825 | -.0004  | .0028  | -.0019 |

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TABLE XII.- AERODYNAMIC CHARACTERISTICS OF MODEL 4  
 (a)  $x_s/c = 0.70$ ;  $h/c = 0$  and  $0.10$

| $\alpha$                        | $C_L$  | $C_D$  | $C_m$  | $C_Y$   | $C_l$   | $C_n$   |
|---------------------------------|--------|--------|--------|---------|---------|---------|
| $h/c = 0$                       |        |        |        |         |         |         |
| -2.01                           | -0.088 | 0.0317 | 0.0221 | 0.0037  | -0.0009 | -0.0007 |
| .07                             | .055   | .0290  | .0056  | .0038   | -.0012  | -.0009  |
| 2.16                            | .200   | .0299  | -.0078 | .0038   | -.0025  | -.0010  |
| 4.25                            | .337   | .0346  | -.0175 | .0036   | -.0024  | -.0011  |
| 6.33                            | .467   | .0422  | -.0382 | .0043   | -.0022  | -.0010  |
| 8.41                            | .612   | .0534  | -.0525 | .0038   | -.0016  | -.0007  |
| 10.50                           | .750   | .0687  | -.0707 | .0049   | -.0030  | -.0011  |
| 12.58                           | .885   | .0872  | -.0795 | .0038   | -.0024  | -.0012  |
| 14.65                           | .997   | .1377  | -.0827 | -.0029  | .0013   | .0015   |
| 16.64                           | .973   | .2311  | -.0391 | .0004   | .0019   | -.0008  |
| $h/c = 0.10$                    |        |        |        |         |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 0.20$ |        |        |        |         |         |         |
| -2.04                           | -0.135 | 0.0408 | 0.0087 | 0.0010  | 0.0038  | 0.0016  |
| .04                             | .005   | .0380  | -.0116 | .0011   | .0037   | .0012   |
| 2.13                            | .139   | .0387  | -.0258 | .0019   | .0040   | .0008   |
| 4.21                            | .281   | .0422  | -.0433 | .0023   | .0033   | .0006   |
| 6.29                            | .411   | .0494  | -.0588 | .0026   | .0039   | .0002   |
| 8.38                            | .551   | .0592  | -.0763 | .0041   | .0027   | -.0003  |
| 10.46                           | .694   | .0734  | -.0895 | .0047   | .0030   | -.0006  |
| 12.54                           | .822   | .0910  | -.1024 | .0059   | .0022   | -.0013  |
| 14.61                           | .934   | .1214  | -.0966 | .0064   | .0015   | -.0010  |
| 15.62                           | .954   | .1857  | -.0811 | .0056   | .0004   | -.0022  |
| $h/c = 0.10$                    |        |        |        |         |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 0.60$ |        |        |        |         |         |         |
| -2.12                           | -0.263 | 0.0675 | 0.0293 | -0.0021 | 0.0270  | 0.0068  |
| -.04                            | -.131  | .0623  | .0107  | -.0014  | .0285   | .0056   |
| 2.04                            | .003   | .0606  | .0011  | -.0020  | .0291   | .0049   |
| 4.12                            | .137   | .0623  | -.0175 | .0028   | .0288   | .0037   |
| 6.20                            | .269   | .0664  | -.0279 | .0030   | .0304   | .0027   |
| 8.29                            | .415   | .0741  | -.0471 | -.0037  | .0298   | .0019   |
| 10.38                           | .551   | .0848  | -.0641 | -.0035  | .0302   | .0003   |
| 12.46                           | .689   | .1008  | -.0739 | -.0043  | .0303   | -.0004  |
| 14.54                           | .818   | .1214  | -.0800 | -.0054  | .0296   | -.0004  |
| $h/c = 0.10$                    |        |        |        |         |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 1.00$ |        |        |        |         |         |         |
| -2.15                           | -0.305 | 0.0856 | 0.0645 | -0.0050 | 0.0435  | 0.0134  |
| -.07                            | -.180  | .0807  | .0492  | -.0060  | .0446   | .0123   |
| 2.01                            | -.045  | .0787  | .0352  | -.0078  | .0459   | .0112   |
| 4.09                            | .087   | .0781  | .0208  | -.0090  | .0468   | .0100   |
| 6.18                            | .222   | .0807  | .0048  | -.0113  | .0490   | .0083   |
| 8.26                            | .359   | .0857  | -.0089 | -.0117  | .0496   | .0069   |
| 10.35                           | .501   | .0946  | -.0229 | -.0133  | .0495   | .0055   |
| 12.44                           | .646   | .1088  | -.0410 | -.0154  | .0486   | .0035   |
| 14.52                           | .789   | .1268  | -.0466 | -.0163  | .0443   | .0021   |
| $h/c = 0.10$                    |        |        |        |         |         |         |
| $\eta_1 = 0.20$ $\eta_0 = 0.40$ |        |        |        |         |         |         |
| -2.09                           | -0.218 | 0.0556 | 0.0048 | -0.0020 | 0.0135  | 0.0040  |
| -.01                            | -.075  | .0518  | -.0133 | 0       | .0150   | .0033   |
| 2.08                            | .058   | .0505  | -.0288 | 0       | .0159   | .0025   |
| 4.16                            | .189   | .0531  | -.0440 | .0010   | .0153   | .0017   |
| 6.24                            | .329   | .0584  | -.0566 | .0019   | .0157   | .0008   |
| 8.33                            | .472   | .0669  | -.0705 | .0010   | .0163   | .0002   |
| 10.41                           | .603   | .0796  | -.0886 | .0014   | .0169   | -.0006  |
| 12.49                           | .741   | .0963  | -.0989 | .0007   | .0178   | -.0011  |
| 14.57                           | .861   | .1197  | -.1050 | -.0013  | .0185   | -.0013  |
| 15.59                           | .897   | .1814  | -.0961 | .0031   | .0138   | -.0033  |
| $h/c = 0.10$                    |        |        |        |         |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 0.80$ |        |        |        |         |         |         |
| -2.14                           | -0.299 | 0.0775 | 0.0490 | -0.0027 | 0.0388  | 0.0097  |
| -.06                            | -.161  | .0720  | .0325  | -.0027  | .0406   | .0088   |
| 2.02                            | -.031  | .0691  | .0169  | -.0047  | .0402   | .0078   |
| 4.10                            | .102   | .0695  | .0046  | -.0057  | .0418   | .0067   |
| 6.18                            | .236   | .0733  | -.0095 | -.0067  | .0410   | .0055   |
| 8.27                            | .373   | .0798  | -.0251 | -.0075  | .0422   | .0050   |
| 10.35                           | .508   | .0896  | -.0412 | -.0087  | .0424   | .0026   |
| 12.44                           | .652   | .1030  | -.0568 | -.0101  | .0413   | .0013   |
| 14.52                           | .783   | .1220  | -.0706 | -.0108  | .0382   | .0005   |
| $h/c = 0.10$                    |        |        |        |         |         |         |
| $\eta_1 = 0.20$ $\eta_0 = 1.00$ |        |        |        |         |         |         |
| -2.12                           | -0.263 | 0.0801 | 0.0711 | -0.0090 | 0.0393  | 0.0126  |
| -.04                            | -.138  | .0758  | .0591  | -.0109  | .0414   | .0121   |
| 2.03                            | -.009  | .0730  | .0467  | -.0121  | .0433   | .0109   |
| 4.11                            | .126   | .0740  | .0373  | -.0147  | .0445   | .0100   |
| 6.20                            | .257   | .0770  | .0291  | -.0165  | .0459   | .0089   |
| 8.28                            | .390   | .0827  | .0126  | -.0182  | .0471   | .0072   |
| 10.36                           | .530   | .0923  | -.0025 | -.0200  | .0474   | .0059   |
| 12.45                           | .671   | .1059  | -.0197 | -.0218  | .0464   | .0049   |
| 14.54                           | .810   | .1250  | -.0329 | -.0118  | .0395   | .0038   |
| 16.60                           | .908   | .1983  | -.0421 | .0150   | .0073   | -.0073  |

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TABLE XII.-- AERODYNAMIC CHARACTERISTICS OF MODEL 4 - Concluded  
(b)  $x_B/c = 0.70$ ;  $h/c = 0.10$

| $\alpha$ | $c_L$        | $c_D$  | $c_m$  | $c_Y$           | $c_l$  | $c_n$           | $\alpha$ | $c_L$        | $c_D$  | $c_m$  | $c_Y$           | $c_l$  | $c_n$           |
|----------|--------------|--------|--------|-----------------|--------|-----------------|----------|--------------|--------|--------|-----------------|--------|-----------------|
|          |              |        |        |                 |        |                 |          |              |        |        |                 |        |                 |
|          | $h/c = 0.10$ |        |        | $\eta_1 = 0.40$ |        | $\eta_0 = 1.00$ |          | $h/c = 0.10$ |        |        | $\eta_1 = 0.60$ |        | $\eta_0 = 1.00$ |
| -2.08    | -0.195       | 0.0662 | 0.0659 | -0.0071         | 0.0257 | 0.0111          | -2.05    | -0.142       | 0.0541 | 0.0443 | -0.0040         | 0.0135 | 0.0087          |
| 0        | -0.063       | 0.0628 | 0.0475 | -0.0086         | 0.0283 | 0.0107          | .04      | -.001        | .0508  | .0316  | -.0058          | .0153  | .0085           |
| 2.09     | .082         | 0.0612 | 0.0351 | -.0103          | 0.0299 | 0.0101          | 2.12     | .138         | 0.0500 | 0.0218 | -.0058          | .0160  | .0078           |
| 4.17     | .216         | 0.0628 | 0.0219 | -.0117          | 0.0308 | 0.0095          | 4.21     | .272         | 0.0525 | .0117  | -.0070          | .0177  | .0074           |
| 6.25     | .346         | 0.0675 | 0.0126 | -.0137          | 0.0317 | 0.0087          | 6.29     | .403         | 0.0577 | -.0016 | -.0084          | .0195  | .0067           |
| 8.34     | .483         | 0.0753 | -.0013 | -.0157          | 0.0337 | 0.0079          | 8.37     | .544         | 0.0677 | -.0170 | -.0090          | .0192  | .0064           |
| 10.42    | .629         | 0.0869 | -.0139 | -.0167          | 0.0337 | 0.0071          | 10.46    | .685         | 0.0804 | -.0317 | -.0107          | .0195  | .0060           |
| 12.50    | .759         | .1015  | -.0345 | -.0189          | 0.0322 | 0.0062          | 12.54    | .825         | 0.0969 | -.0485 | -.0112          | .0185  | .0053           |
| 14.59    | .903         | .1298  | -.0393 | -.0119          | 0.0267 | 0.0023          | 14.64    | .959         | 1.327  | -.0629 | -.0052          | .0113  | .0021           |
| 15.62    | .943         | .1733  | -.0478 | -.0086          | 0.0214 | 0.0050          | 15.65    | 1.004        | 1.803  | -.0622 | .0138           | -.0084 | -.0038          |
|          |              |        |        |                 |        |                 |          |              |        |        |                 |        |                 |
|          | $h/c = 0.10$ |        |        | $\eta_1 = 0.80$ |        | $\eta_0 = 1.00$ |          | $h/c = 0.10$ |        |        | $\eta_1 = 0.40$ |        | $\eta_0 = 0.80$ |
| -2.02    | -0.106       | 0.0422 | 0.0276 | -0.0004         | 0.0041 | 0.0046          | -2.07    | -0.183       | 0.0575 | 0.0525 | -0.0045         | 0.0233 | 0.0074          |
| .06      | .036         | 0.0390 | .0146  | -.0010          | 0.0038 | 0.0042          | .01      | -.047        | .0538  | .0393  | -.0052          | .0244  | .0070           |
| 2.15     | .173         | 0.0393 | .0037  | -.0020          | 0.0055 | 0.0039          | 2.09     | .088         | 0.0532 | .0282  | -.0070          | .0256  | .0067           |
| 4.23     | .309         | 0.0427 | -.0018 | -.0024          | 0.0060 | 0.0036          | 4.18     | .224         | 0.0551 | .0174  | -.0087          | .0280  | .0062           |
| 6.32     | .452         | 0.0493 | -.0226 | -.0032          | 0.0064 | 0.0035          | 6.26     | .357         | 0.0605 | .0072  | -.0098          | .0285  | .0056           |
| 8.40     | .584         | 0.0606 | -.0422 | -.0030          | 0.0066 | 0.0032          | 8.34     | .493         | 0.0695 | -.0083 | -.0105          | .0283  | .0051           |
| 10.48    | .720         | 0.0746 | -.0588 | -.0054          | 0.0064 | 0.0033          | 10.42    | .628         | 0.0820 | -.0261 | -.0139          | .0302  | .0045           |
| 12.57    | .864         | 0.0924 | -.0668 | -.0059          | 0.0052 | 0.0034          | 12.51    | .771         | 0.0977 | -.0401 | -.0146          | .0281  | .0037           |
| 14.65    | 1.002        | .1341  | -.0883 | -.0059          | -.0028 | -.0013          | 14.59    | .903         | 1.224  | -.0525 | -.0098          | .0243  | .0021           |
| 15.66    | 1.016        | .1802  | -.0729 | .0168           | -.0112 | -.0042          | 16.63    | .971         | .2267  | -.0525 | .0021           | .0019  | -.0028          |

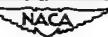


TABLE XIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 4  
WITH HORIZONTAL TAIL REMOVED  
(a)  $x_s/c = 0.70$ ;  $h/c = 0$  and  $0.05$

| $\alpha$                        | $c_L$  | $c_D$  | $c_m$  | $c_Y$  | $c_l$   | $c_n$   |
|---------------------------------|--------|--------|--------|--------|---------|---------|
| $h/c = 0$                       |        |        |        |        |         |         |
| -2.01                           | -0.078 | 0.0315 | 0.0113 | 0.0024 | -0.0004 | -0.0005 |
| .08                             | .060   | .0285  | .0126  | .0024  | -.0008  | -.0005  |
| 2.15                            | .187   | .0293  | .0129  | .0032  | -.0017  | -.0006  |
| 4.24                            | .320   | .0334  | .0134  | .0025  | -.0015  | -.0007  |
| 6.32                            | .452   | .0399  | .0176  | .0022  | -.0009  | -.0006  |
| 8.40                            | .584   | .0495  | .0177  | .0043  | -.0023  | -.0006  |
| 10.48                           | .710   | .0629  | .0166  | .0023  | -.0016  | -.0007  |
| 12.55                           | .827   | .0804  | .0192  | .0032  | -.0022  | -.0004  |
| 14.62                           | .950   | .1151  | .0282  | -.0092 | -.0028  | -.0031  |
| 16.62                           | .955   | .2269  | .0595  | .0030  | -.0042  | -.0001  |
| $h/c = 0.05$                    |        |        |        |        |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 0.20$ |        |        |        |        |         |         |
| -2.02                           | -0.090 | 0.0357 | 0.0029 | 0.0033 | 0.0010  | -0.0003 |
| .02                             | .027   | .0336  | 0      | .0028  | .0007   | -.0002  |
| 2.14                            | .164   | .0338  | .0090  | .0020  | .0013   | -.0002  |
| 4.22                            | .291   | .0374  | .0059  | .0028  | .0005   | -.0002  |
| 6.29                            | .416   | .0436  | .0077  | .0024  | .0020   | -.0001  |
| 8.38                            | .554   | .0529  | .0114  | .0037  | .0003   | -.0002  |
| 10.46                           | .690   | .0659  | .0099  | .0038  | .0005   | -.0005  |
| 12.53                           | .805   | .0817  | .0115  | .0044  | .0003   | -.0010  |
| 14.60                           | .921   | .1025  | .0175  | .0020  | .0029   | -.0011  |
| 15.63                           | .962   | .1536  | .0197  | .0019  | .0003   | -.0009  |
| $h/c = 0.05$                    |        |        |        |        |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 0.60$ |        |        |        |        |         |         |
| -2.07                           | -0.178 | 0.0492 | 0.0096 | 0.0027 | 0.0158  | 0.0024  |
| .01                             | -.052  | .0461  | .0015  | .0021  | .0168   | .0021   |
| 2.09                            | .076   | .0450  | .0179  | .0013  | .0170   | .0019   |
| 4.17                            | .206   | .0468  | .0184  | .0004  | .0181   | .0014   |
| 6.24                            | .331   | .0511  | .0213  | .0007  | .0180   | .0012   |
| 8.32                            | .461   | .0590  | .0213  | 0      | .0172   | .0003   |
| 10.40                           | .595   | .0697  | .0191  | -.0011 | .0179   | 0       |
| 12.48                           | .726   | .0838  | .0164  | -.0020 | .0181   | -.0003  |
| 14.56                           | .846   | .1008  | .0265  | -.0030 | .0174   | -.0012  |
| 15.59                           | .901   | .1398  | .0253  | .0109  | .0095   | -.0076  |
| $h/c = 0.05$                    |        |        |        |        |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 1.00$ |        |        |        |        |         |         |
| -2.08                           | -0.202 | 0.0584 | 0.0261 | 0.0020 | 0.0265  | 0.0060  |
| -.01                            | -.083  | .0541  | .0273  | .0013  | .0283   | .0055   |
| 2.07                            | .047   | .0525  | .0344  | -.0013 | .0290   | .0048   |
| 4.14                            | .169   | .0536  | .0371  | -.0026 | .0298   | .0043   |
| 6.22                            | .300   | .0568  | .0399  | -.0048 | .0307   | .0037   |
| 8.30                            | .427   | .0635  | .0403  | -.0051 | .0296   | .0028   |
| 10.38                           | .562   | .0731  | .0396  | -.0079 | .0310   | .0020   |
| 12.40                           | .694   | .0862  | .0327  | -.0085 | .0286   | .0012   |
| 14.55                           | .829   | .1030  | .0361  | -.0088 | .0261   | .0008   |
| 15.58                           | .890   | .1408  | .0352  | .0056  | .0135   | -.0040  |
| $h/c = 0$                       |        |        |        |        |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 0.20$ |        |        |        |        |         |         |
| -2.05                           | -0.143 | 0.0429 | 0.0066 | 0.0025 | 0.0087  | 0.0013  |
| .03                             | -.018  | .0402  | .0079  | .0030  | .0084   | .0009   |
| 2.10                            | .100   | .0401  | .0080  | .0022  | .0078   | .0005   |
| 4.19                            | .238   | .0425  | .0100  | .0017  | .0089   | .0004   |
| 6.26                            | .360   | .0476  | .0125  | .0018  | .0100   | .0002   |
| 8.34                            | .493   | .0561  | .0123  | .0015  | .0093   | -.0002  |
| 10.42                           | .626   | .0676  | .0128  | .0013  | .0097   | -.0005  |
| 12.51                           | .762   | .0828  | .0135  | .0011  | .0093   | -.0007  |
| 14.58                           | .875   | .1065  | .0179  | .0049  | .0114   | -.0037  |
| 15.60                           | .917   | .1483  | .0185  | .0080  | .0039   | -.0034  |
| $h/c = 0.05$                    |        |        |        |        |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 0.40$ |        |        |        |        |         |         |
| -2.08                           | -0.198 | 0.0543 | 0.0236 | 0.0034 | 0.0246  | 0.0042  |
| -.01                            | -.079  | .0506  | .0214  | .0017  | .0239   | .0038   |
| 2.07                            | .053   | .0489  | .0245  | .0003  | .0261   | .0035   |
| 4.15                            | .183   | .0503  | .0309  | -.0017 | .0235   | .0027   |
| 6.22                            | .302   | .0541  | .0295  | -.0025 | .0264   | .0022   |
| 8.31                            | .434   | .0610  | .0292  | -.0030 | .0269   | .0015   |
| 10.39                           | .571   | .0715  | .0305  | -.0035 | .0258   | .0009   |
| 12.47                           | .704   | .0849  | .0298  | -.0052 | .0254   | .0004   |
| 14.55                           | .832   | .1015  | .0334  | -.0043 | .0229   | -.0006  |
| 15.59                           | .903   | .1287  | .0273  | -.0026 | .0186   | -.0015  |
| $h/c = 0$                       |        |        |        |        |         |         |
| $\eta_1 = 0.10$ $\eta_0 = 0.80$ |        |        |        |        |         |         |
| -2.08                           | -0.198 | 0.0543 | 0.0236 | 0.0034 | 0.0246  | 0.0042  |
| -.01                            | -.079  | .0506  | .0214  | .0017  | .0239   | .0038   |
| 2.07                            | .053   | .0489  | .0245  | .0003  | .0261   | .0035   |
| 4.15                            | .183   | .0503  | .0309  | -.0017 | .0235   | .0027   |
| 6.22                            | .302   | .0541  | .0295  | -.0025 | .0264   | .0022   |
| 8.31                            | .434   | .0610  | .0292  | -.0030 | .0269   | .0015   |
| 10.39                           | .571   | .0715  | .0305  | -.0035 | .0258   | .0009   |
| 12.47                           | .704   | .0849  | .0298  | -.0052 | .0254   | .0004   |
| 14.55                           | .832   | .1015  | .0334  | -.0043 | .0229   | -.0006  |
| 15.59                           | .903   | .1287  | .0273  | -.0026 | .0186   | -.0015  |
| $h/c = 0.05$                    |        |        |        |        |         |         |
| $\eta_1 = 0.20$ $\eta_0 = 1.00$ |        |        |        |        |         |         |
| -2.06                           | -0.167 | 0.0565 | 0.0269 | 0.0015 | 0.0224  | 0.0060  |
| .02                             | -.040  | .0525  | .0315  | -.0030 | .0236   | .0059   |
| 2.09                            | .084   | .0516  | .0377  | -.0077 | .0248   | .0053   |
| 4.17                            | .213   | .0533  | .0389  | -.0059 | .0254   | .0048   |
| 6.24                            | .332   | .0574  | .0436  | -.0076 | .0266   | .0042   |
| 8.32                            | .465   | .0649  | .0408  | -.0086 | .0266   | .0033   |
| 10.41                           | .597   | .0750  | .0365  | -.0099 | .0271   | .0028   |
| 12.49                           | .731   | .0885  | .0379  | -.0105 | .0248   | .0020   |
| 14.57                           | .861   | .1051  | .0396  | -.0109 | .0228   | .0016   |
| 16.60                           | .922   | .2079  | .0490  | -.0036 | .0089   | -.0014  |

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TABLE XIII.-- AERODYNAMIC CHARACTERISTICS OF MODEL 4  
 WITH HORIZONTAL TAIL REMOVED - Concluded  
 (b)  $x_s/c = 0.70$ ;  $h/c = 0.05$  and  $0.10$

| $\alpha$     | $c_L$  | $c_D$  | $c_m$  | $c_Y$           | $c_l$  | $c_n$  | $\alpha$ | $c_L$        | $c_D$  | $c_m$  | $c_Y$   | $c_l$           | $c_n$  |  |  |
|--------------|--------|--------|--------|-----------------|--------|--------|----------|--------------|--------|--------|---------|-----------------|--------|--|--|
| $h/c = 0.05$ |        |        |        | $\eta_1 = 0.40$ |        |        |          | $h/c = 0.10$ |        |        |         | $\eta_1 = 0.10$ |        |  |  |
| -2.04        | -0.134 | 0.0487 | 0.0237 | -0.0014         | 0.0148 | 0.0057 | -2.09    | -0.212       | 0.0551 | 0.0060 | 0.0024  | 0.0152          | 0.0029 |  |  |
| .03          | -.010  | .0458  | .0289  | -.0024          | .0165  | .0052  | -.01     | -.088        | .0514  | .0039  | .0029   | .0151           | .0022  |  |  |
| 2.12         | .126   | .0452  | .0316  | -.0040          | .0163  | .0048  | 2.06     | .040         | .0505  | .0088  | .0022   | .0152           | .0016  |  |  |
| 4.20         | .257   | .0476  | .0381  | -.0048          | .0165  | .0043  | 4.14     | .171         | .0525  | .0112  | .0027   | .0156           | .0010  |  |  |
| 6.28         | .385   | .0528  | .0391  | -.0056          | .0180  | .0040  | 6.23     | .305         | .0568  | .0101  | .0024   | .0164           | .0004  |  |  |
| 8.35         | .511   | .0608  | .0353  | -.0065          | .0174  | .0034  | 8.30     | .433         | .0644  | .0101  | .0017   | .0177           | .0002  |  |  |
| 10.43        | .640   | .0718  | .0382  | -.0072          | .0184  | .0032  | 10.39    | .564         | .0756  | .0116  | .0011   | .0175           | -.0006 |  |  |
| 12.51        | .771   | .0861  | .0384  | -.0078          | .0161  | .0023  | 12.47    | .696         | .0905  | .0070  | -.0003  | .0184           | -.0010 |  |  |
| 14.59        | .904   | .1043  | .0446  | -.0091          | .0143  | .0024  | 14.54    | .809         | .1085  | .0136  | -.0026  | .0203           | -.0014 |  |  |
| 16.61        | .933   | .2128  | .0447  | -.0036          | .0082  | -.0020 | 16.59    | .892         | .1828  | .0266  | .0128   | .0017           | -.0055 |  |  |
| $h/c = 0.10$ |        |        |        | $\eta_1 = 0.10$ |        |        |          | $h/c = 0.10$ |        |        |         | $\eta_1 = 0.40$ |        |  |  |
| -2.15        | -0.305 | 0.0856 | 0.0452 | -0.0034         | 0.0430 | 0.0127 | -2.07    | -0.182       | 0.0666 | 0.0395 | -0.0076 | 0.0261          | 0.0116 |  |  |
| -.07         | -.184  | .0807  | .0459  | -.0048          | .0439  | .0118  | .01      | -.056        | .0625  | .0436  | -.0088  | .0284           | .0110  |  |  |
| 2.01         | -.057  | .0776  | .0503  | -.0064          | .0450  | .0108  | 2.08     | .071         | .0608  | .0483  | -.0109  | .0297           | .0105  |  |  |
| 4.08         | .072   | .0771  | .0533  | -.0090          | .0474  | .0100  | 4.17     | .205         | .0623  | .0533  | -.0129  | .0307           | .0099  |  |  |
| 6.16         | .192   | .0792  | .0574  | -.0107          | .0483  | .0086  | 6.24     | .332         | .0656  | .0548  | -.0147  | .0327           | .0093  |  |  |
| 8.24         | .329   | .0821  | .0567  | -.0124          | .0499  | .0070  | 8.32     | .454         | .0728  | .0550  | -.0168  | .0339           | .0087  |  |  |
| 10.32        | .461   | .0904  | .0547  | -.0146          | .0493  | .0060  | 10.40    | .591         | .0821  | .0552  | -.0181  | .0331           | .0076  |  |  |
| 12.41        | .598   | .1022  | .0500  | -.0155          | .0470  | .0045  | 12.48    | .723         | .0952  | .0535  | -.0208  | .0317           | .0069  |  |  |
| 14.48        | .720   | .1164  | .0468  | -.0158          | .0439  | .0034  | 14.56    | .852         | .1119  | .0551  | -.0215  | .0289           | .0061  |  |  |
| 16.55        | .837   | .1842  | .0578  | .0115           | .0166  | -.0065 | 16.62    | .948         | .2068  | .0491  | -.0003  | .0033           | -.0026 |  |  |





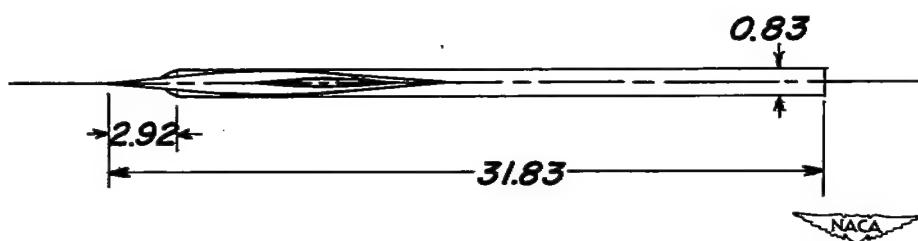
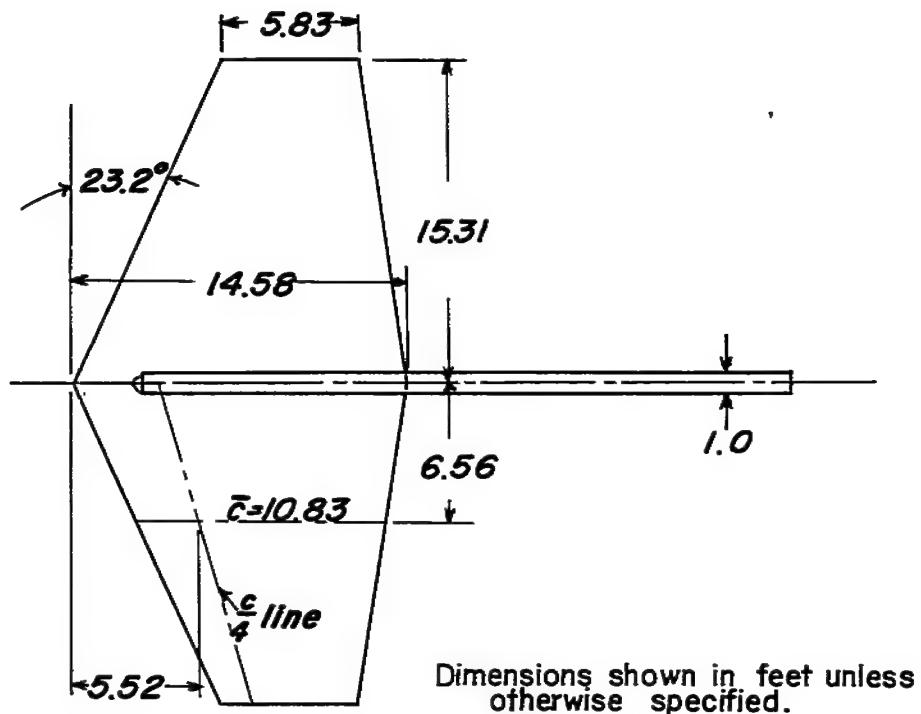


Figure 1.- Geometric details of model 1.

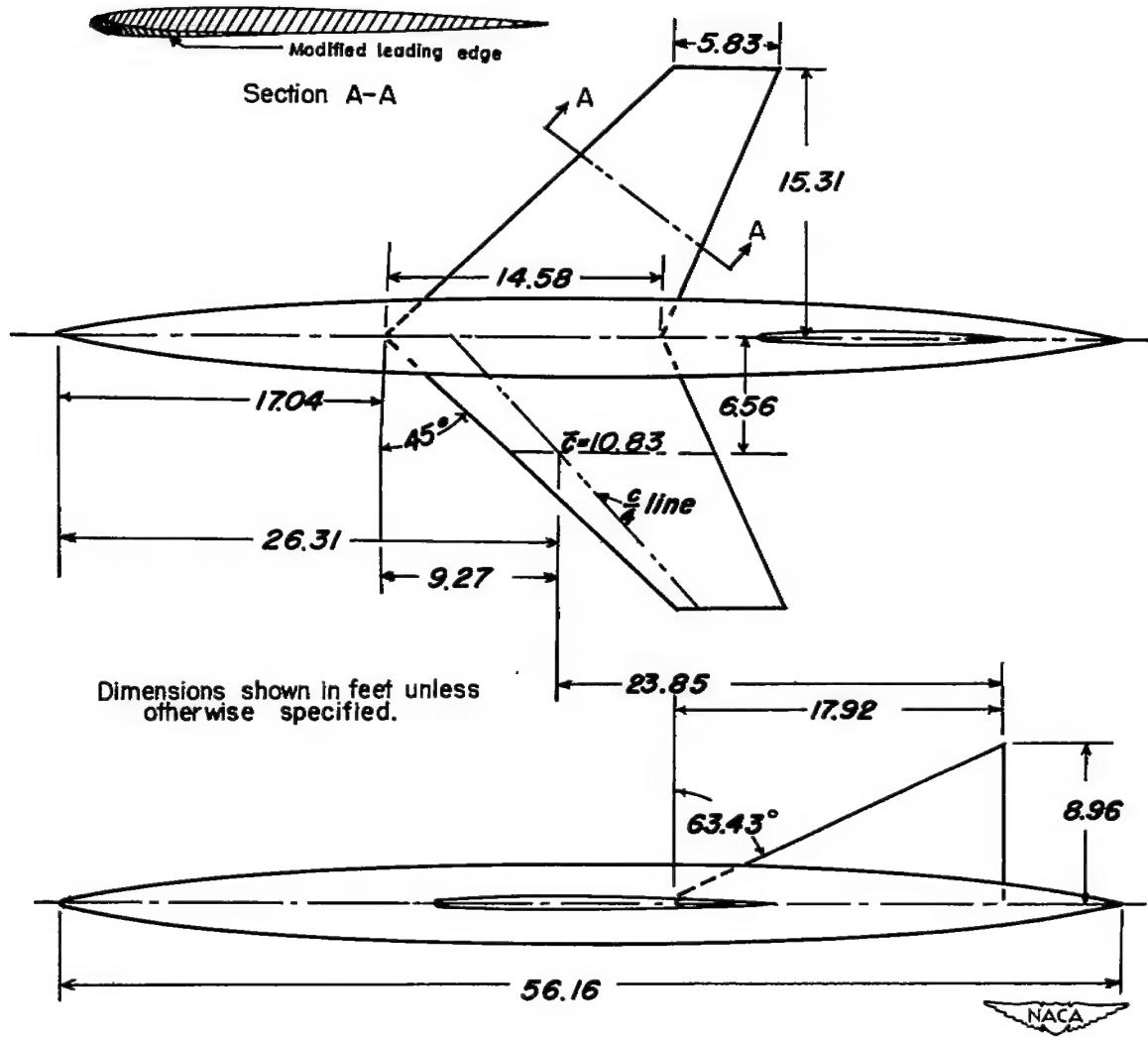


Figure 2.- Geometric details of model 2.

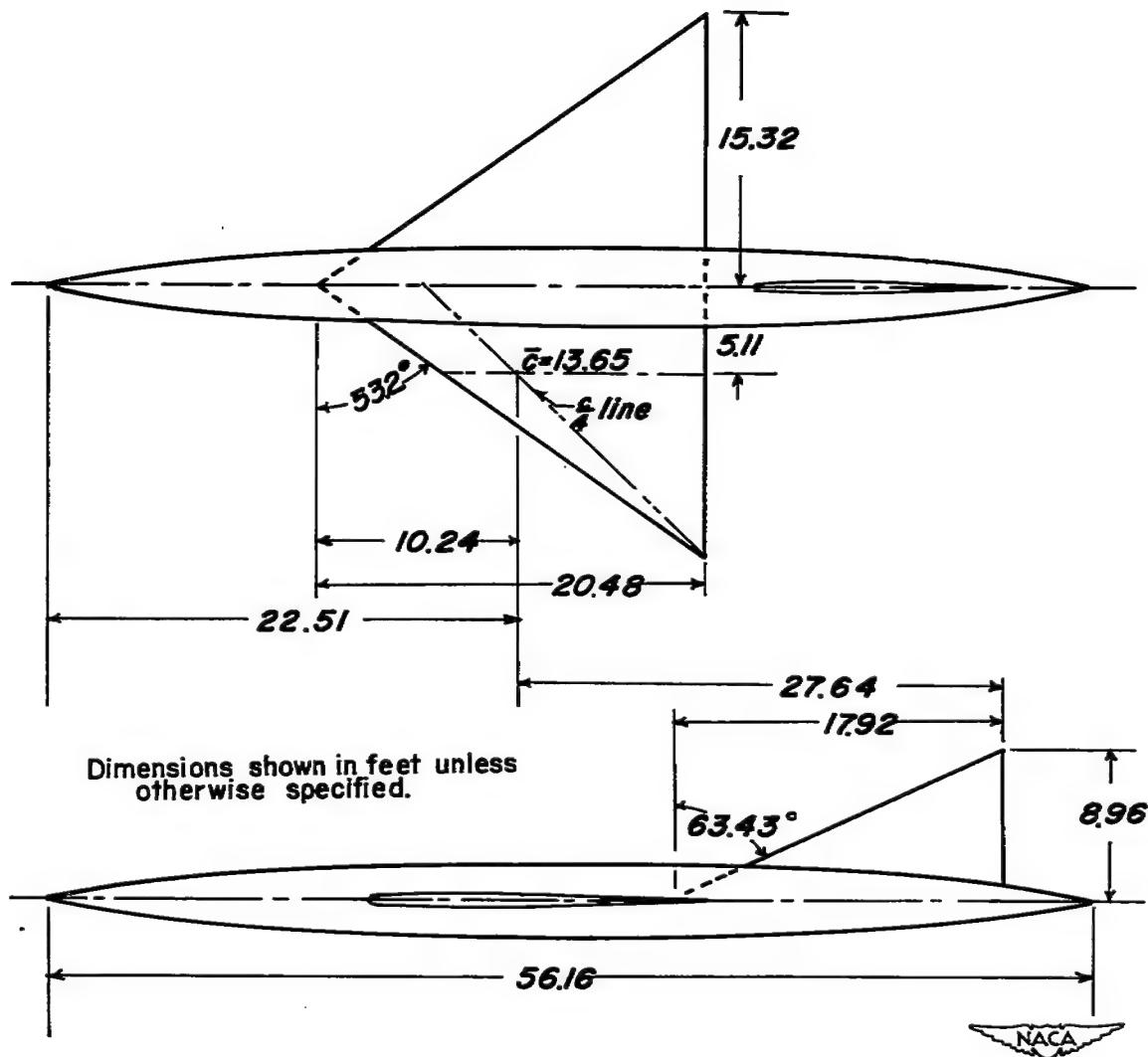


Figure 3.- Geometric details of model 3.

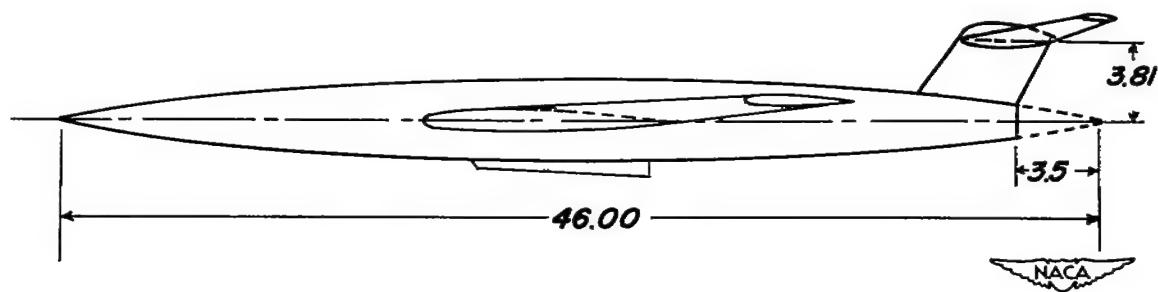
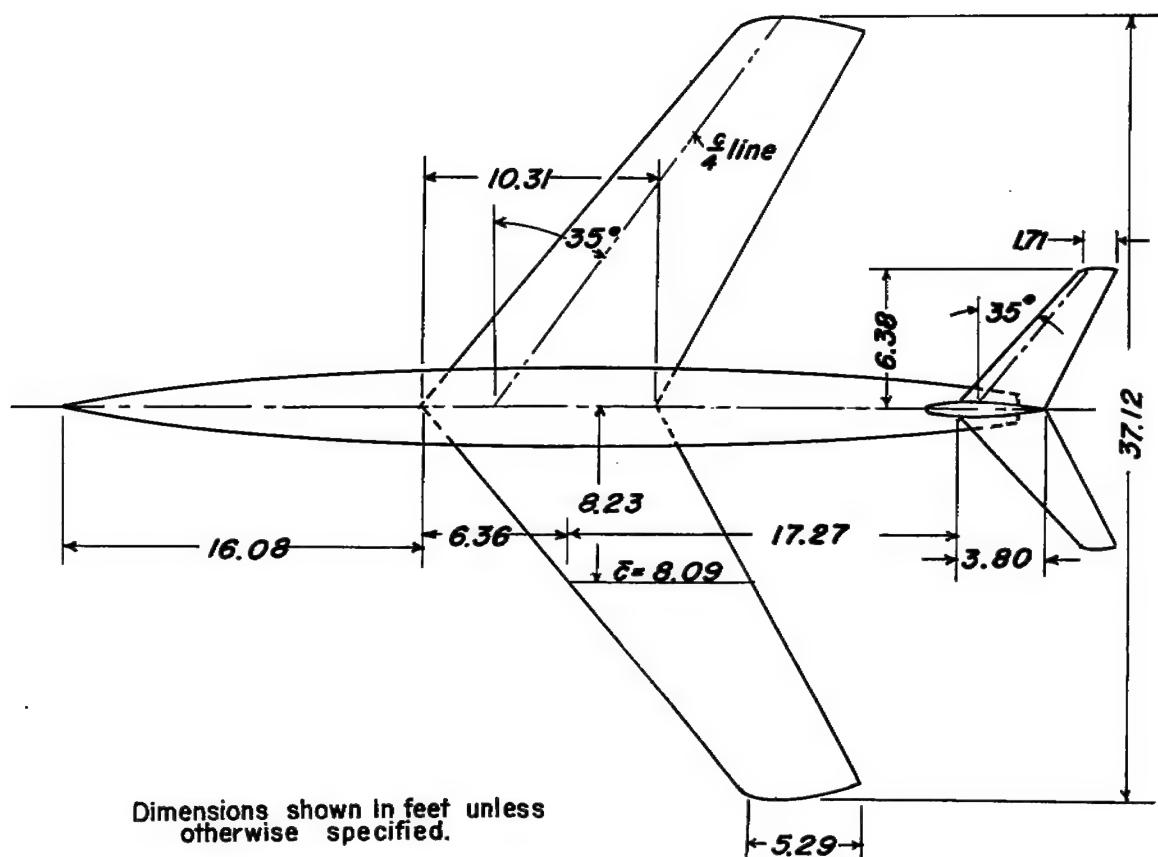
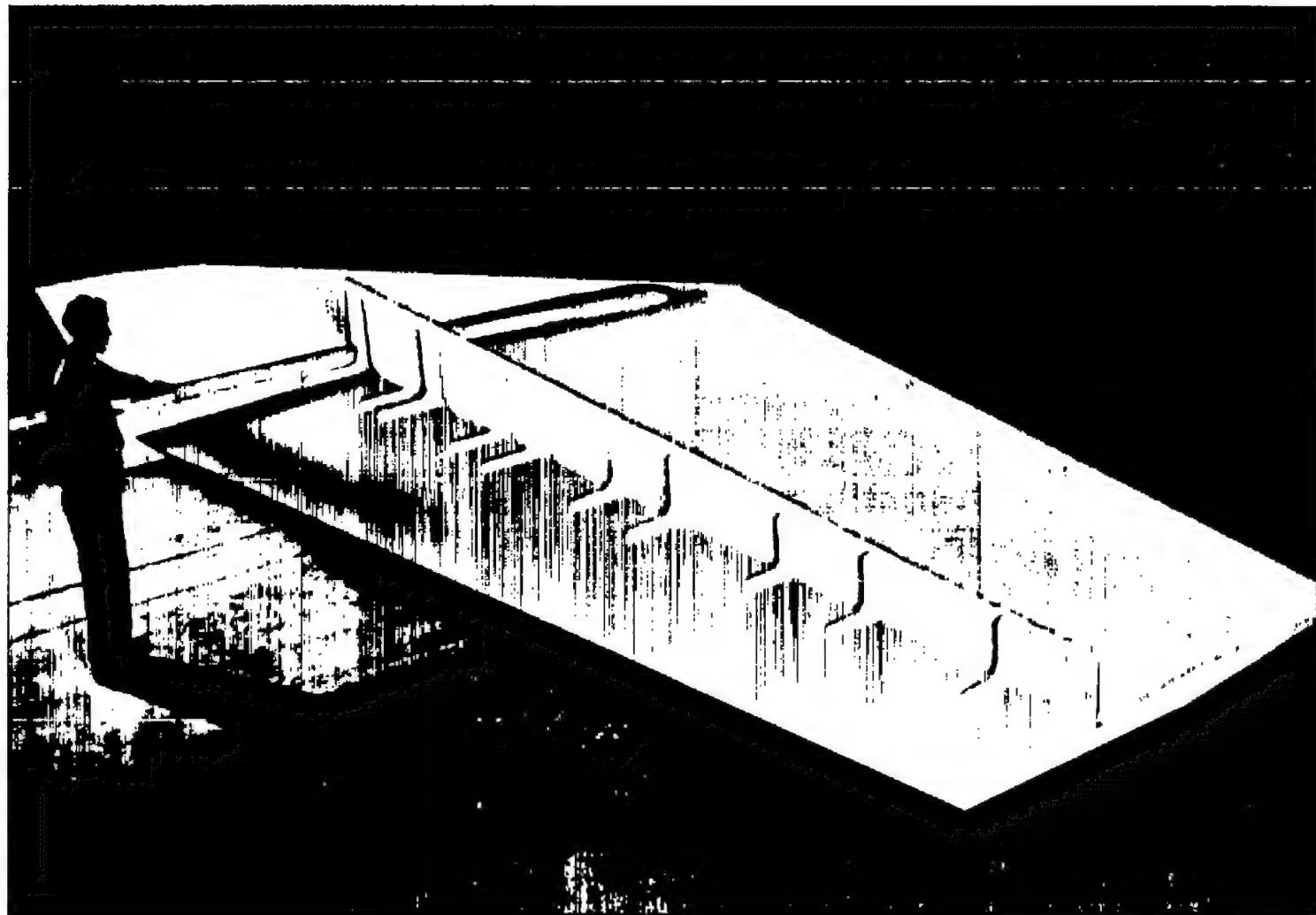


Figure 4.- Geometric details of model 4.



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Figure 5.- Typical spoiler installation.

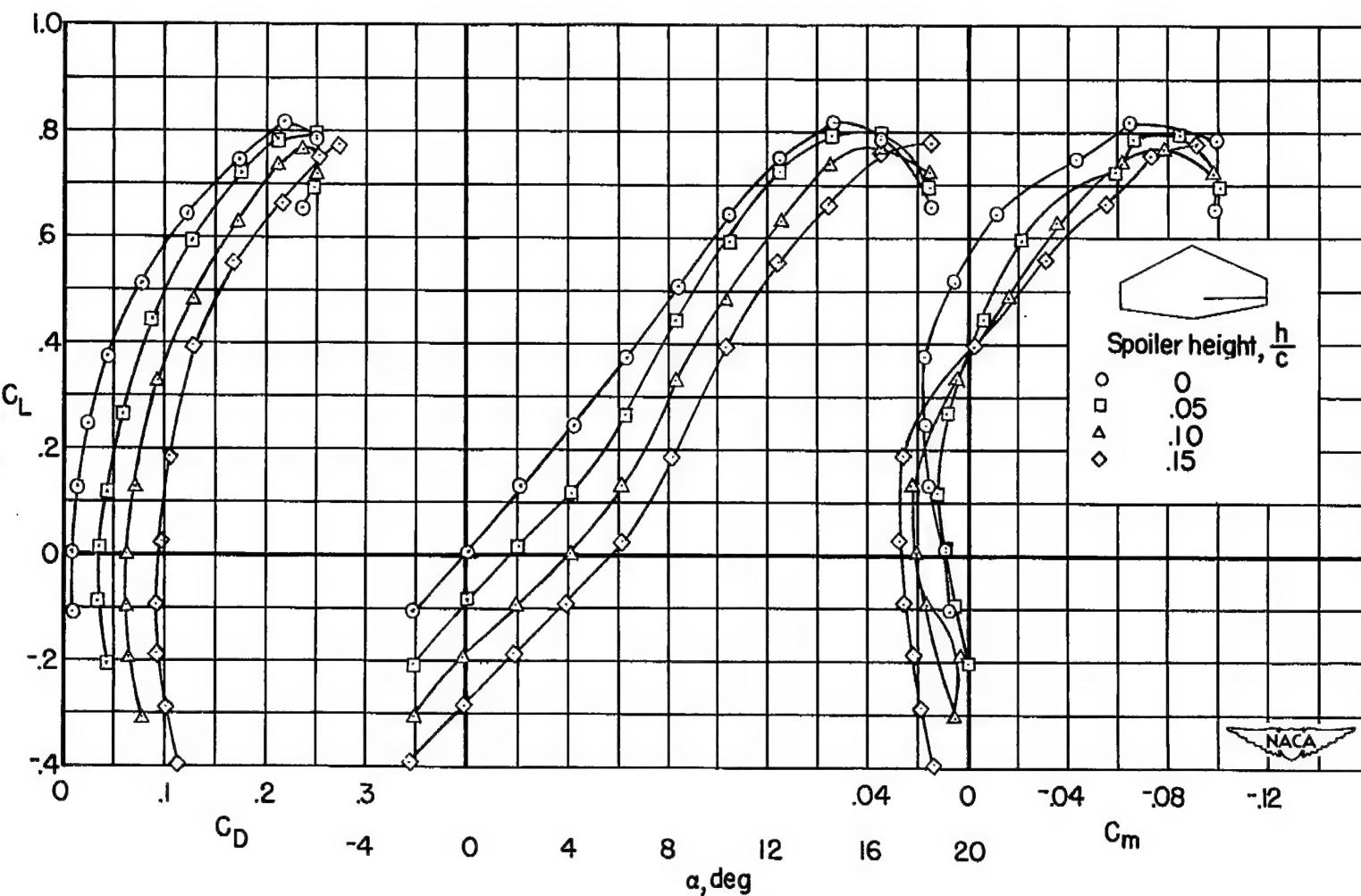
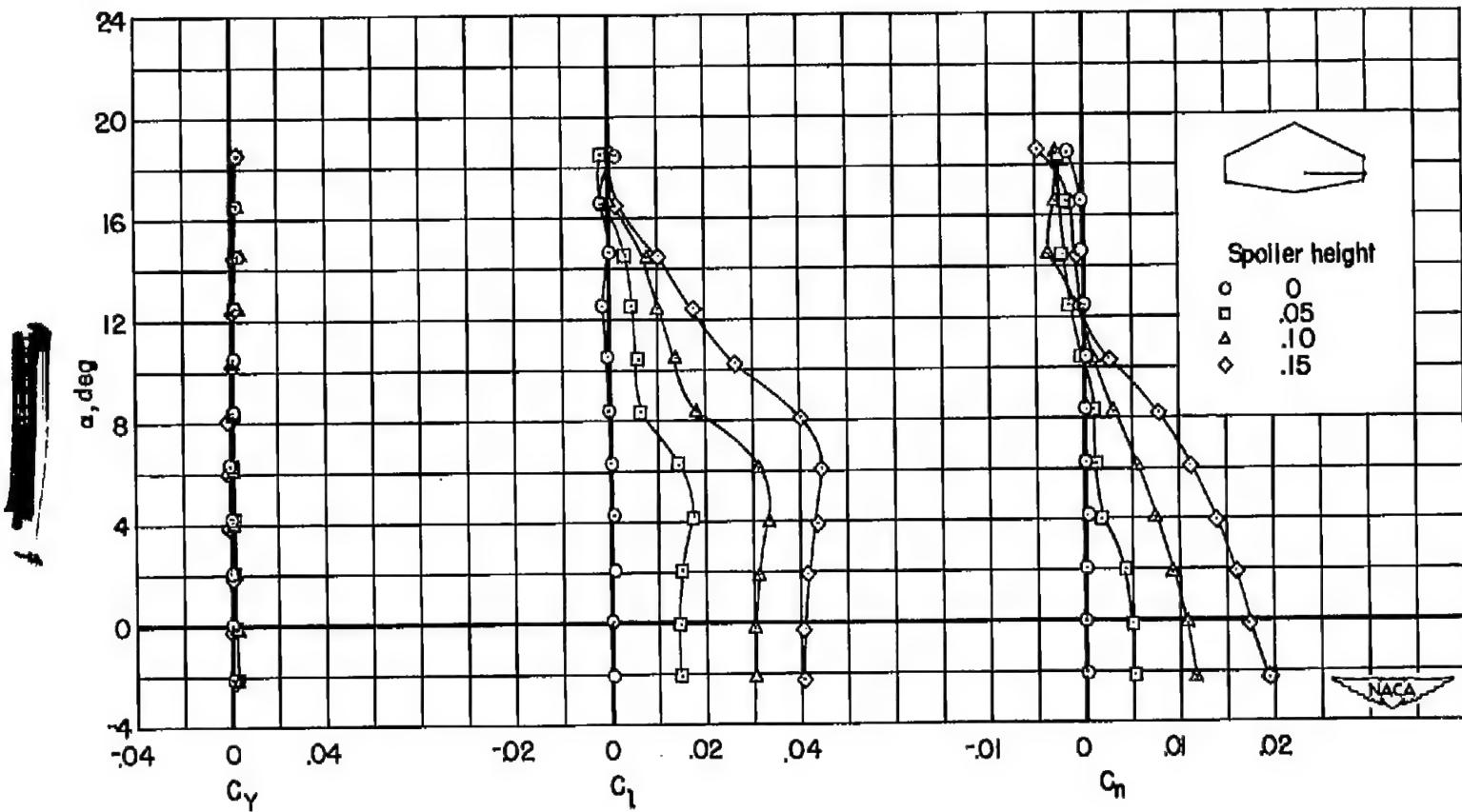
(a)  $C_L$  vs.  $C_D$ ,  $\alpha$ ,  $C_m$ 

Figure 6.- Aerodynamic characteristics of model 1;  $\frac{x_s}{c} = 0.70$ ;  $\eta_1 = 0.15$ ;  $\eta_0 = 1.00$ .



(b)  $\alpha$  vs.  $C_Y$ ,  $C_l$ ,  $C_n$

Figure 6.- Concluded.

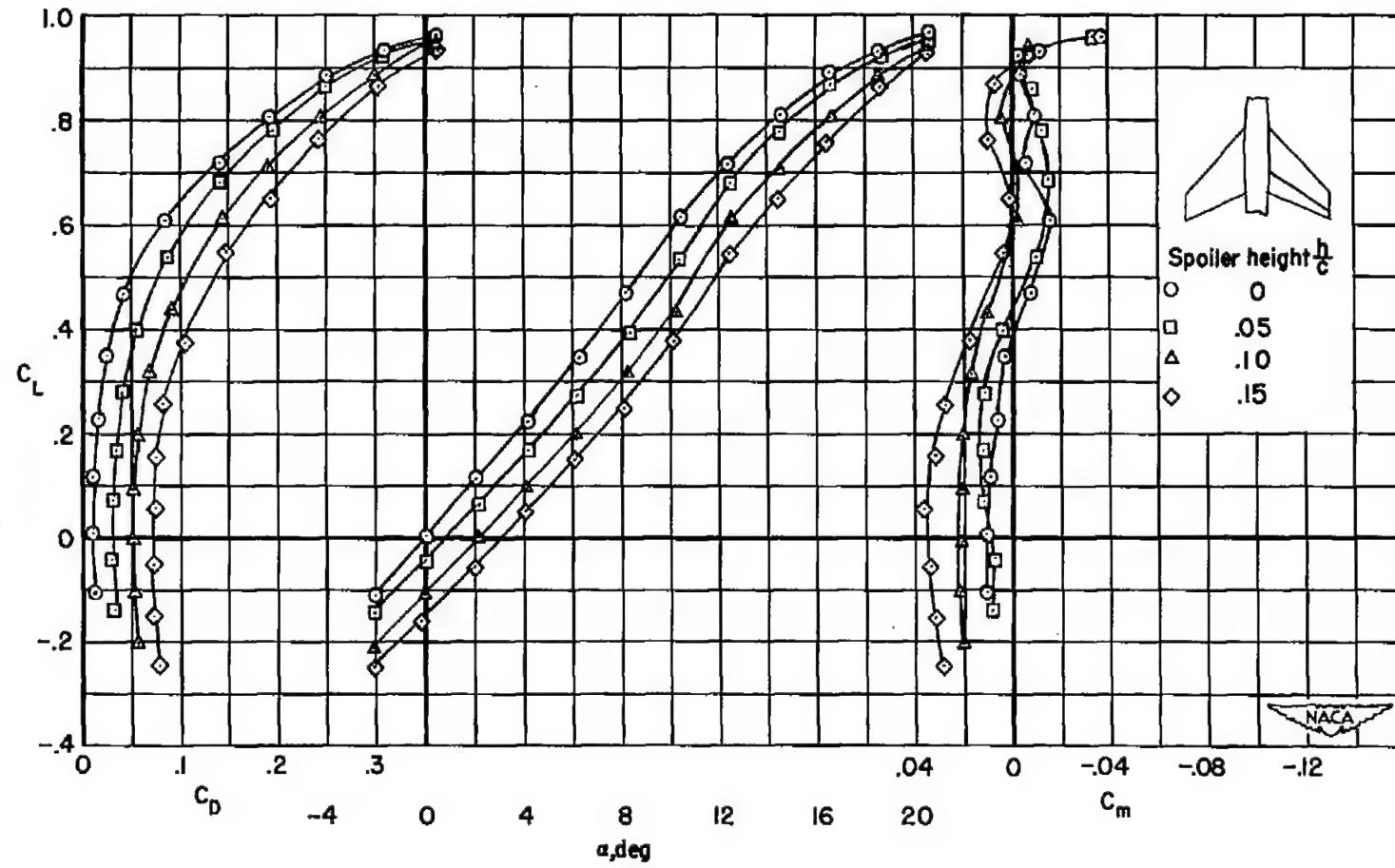
(a)  $C_L$  vs.  $C_D$ ,  $\alpha$ ,  $C_m$ 

Figure 7.- Aerodynamic characteristics of model 2 (unmodified);  $\frac{x_s}{c} = 0.70$ ;  $\eta_1 = 0.15$ ;  $\eta_0 = 1.00$ .

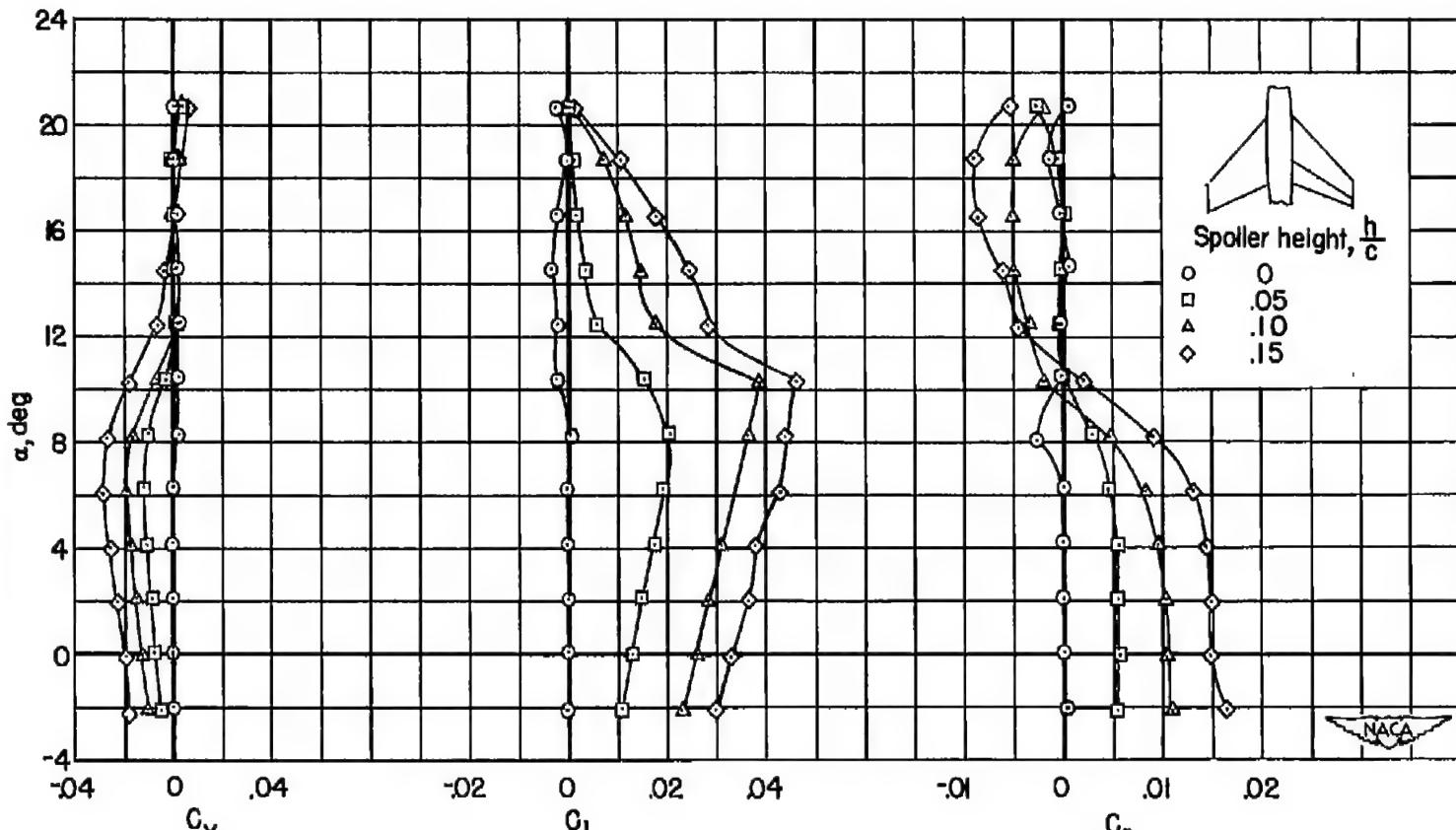
(b)  $\alpha$  vs.  $C_Y$ ,  $C_l$ ,  $C_n$ 

Figure 7.- Concluded.

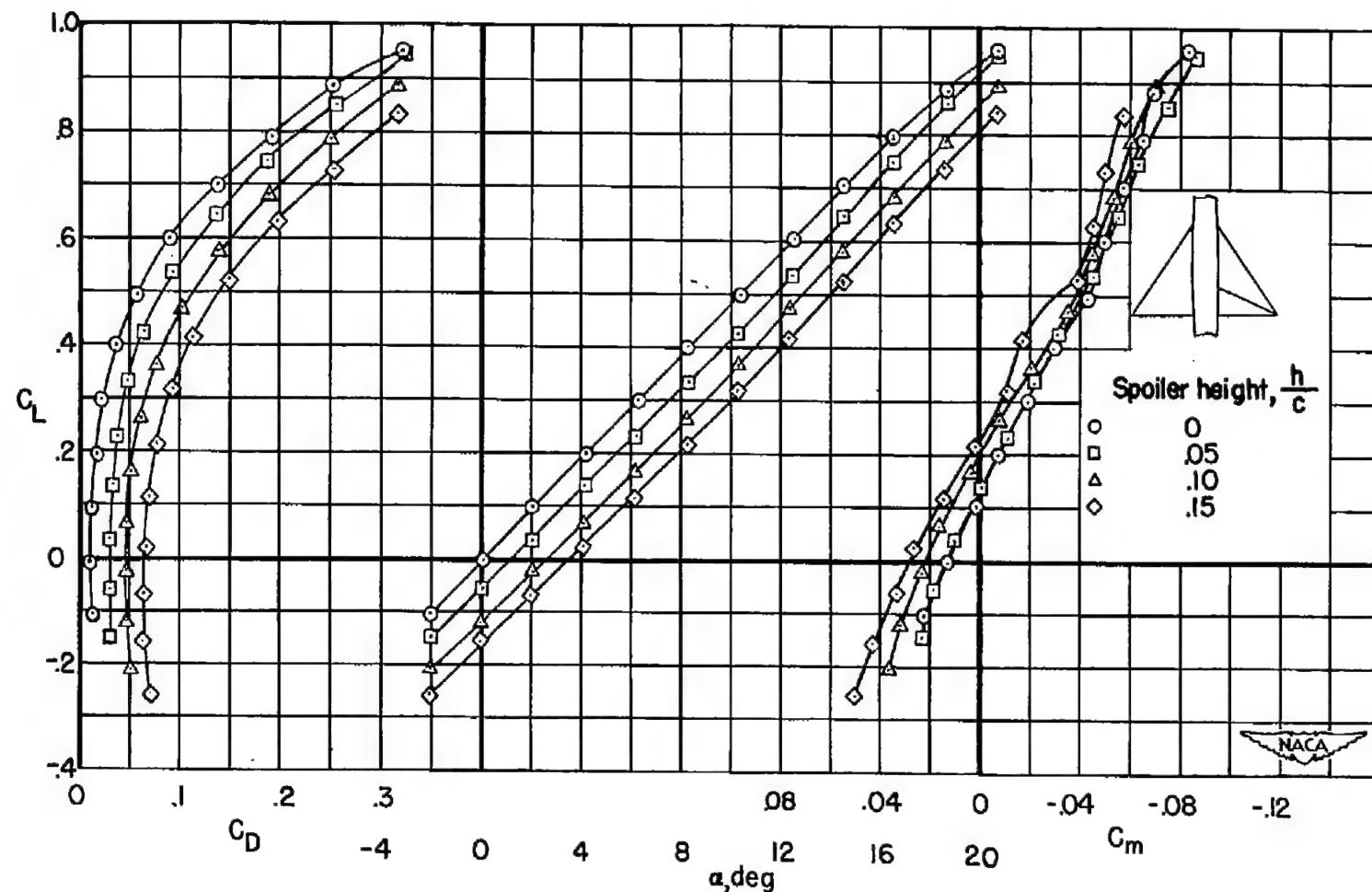
(a)  $C_L$  vs.  $C_D$ ,  $\alpha$ ,  $C_m$ 

Figure 8.- Aerodynamic characteristics of model 3;  $\frac{x_s}{c} = 0.70$ ;  $\eta_1 = 0.15$ ;  $\eta_0 = 1.00$ .

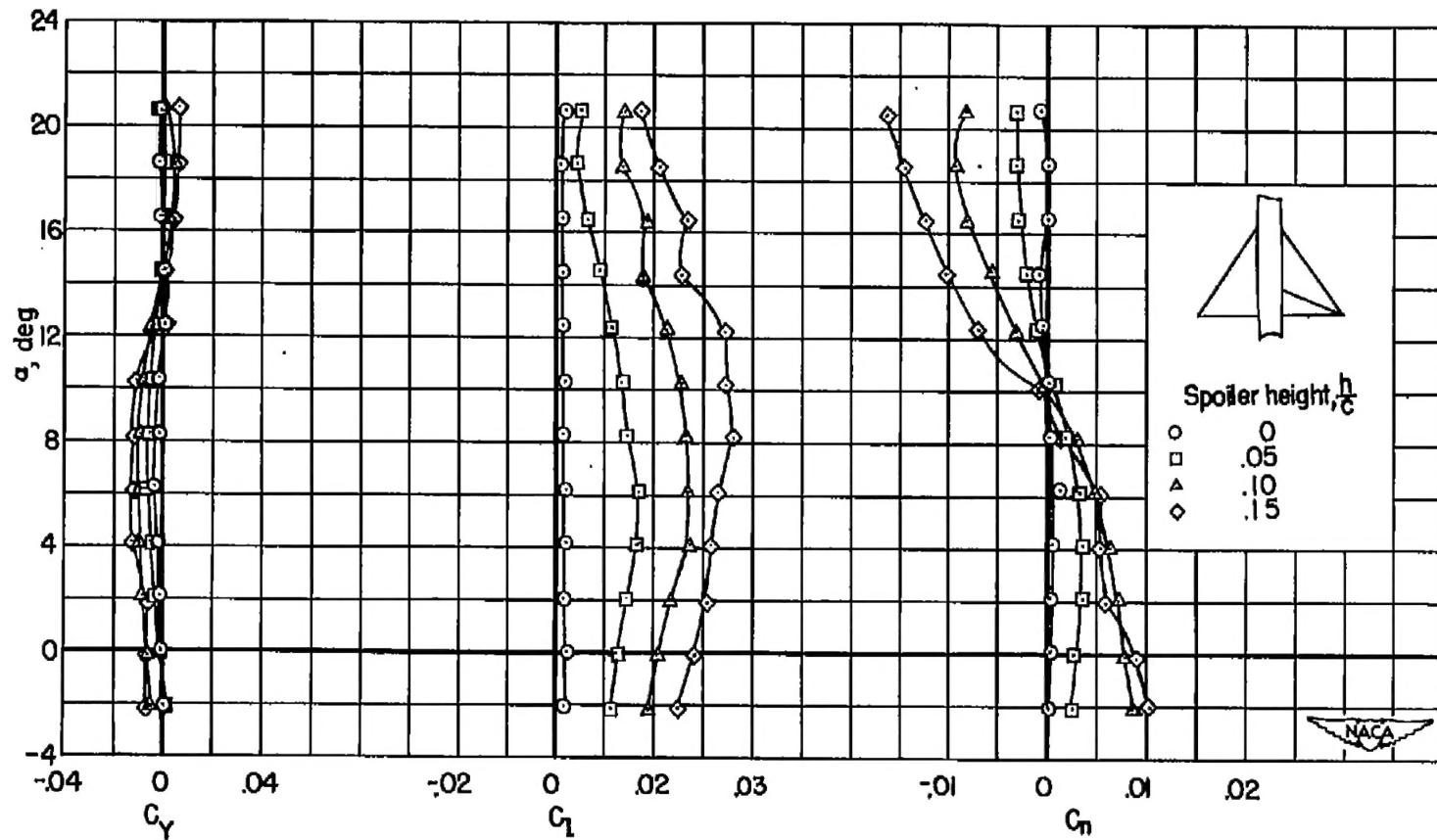
(b)  $\alpha$  vs.  $c_Y$ ,  $c_L$ ,  $c_n$ 

Figure 8.- Concluded.

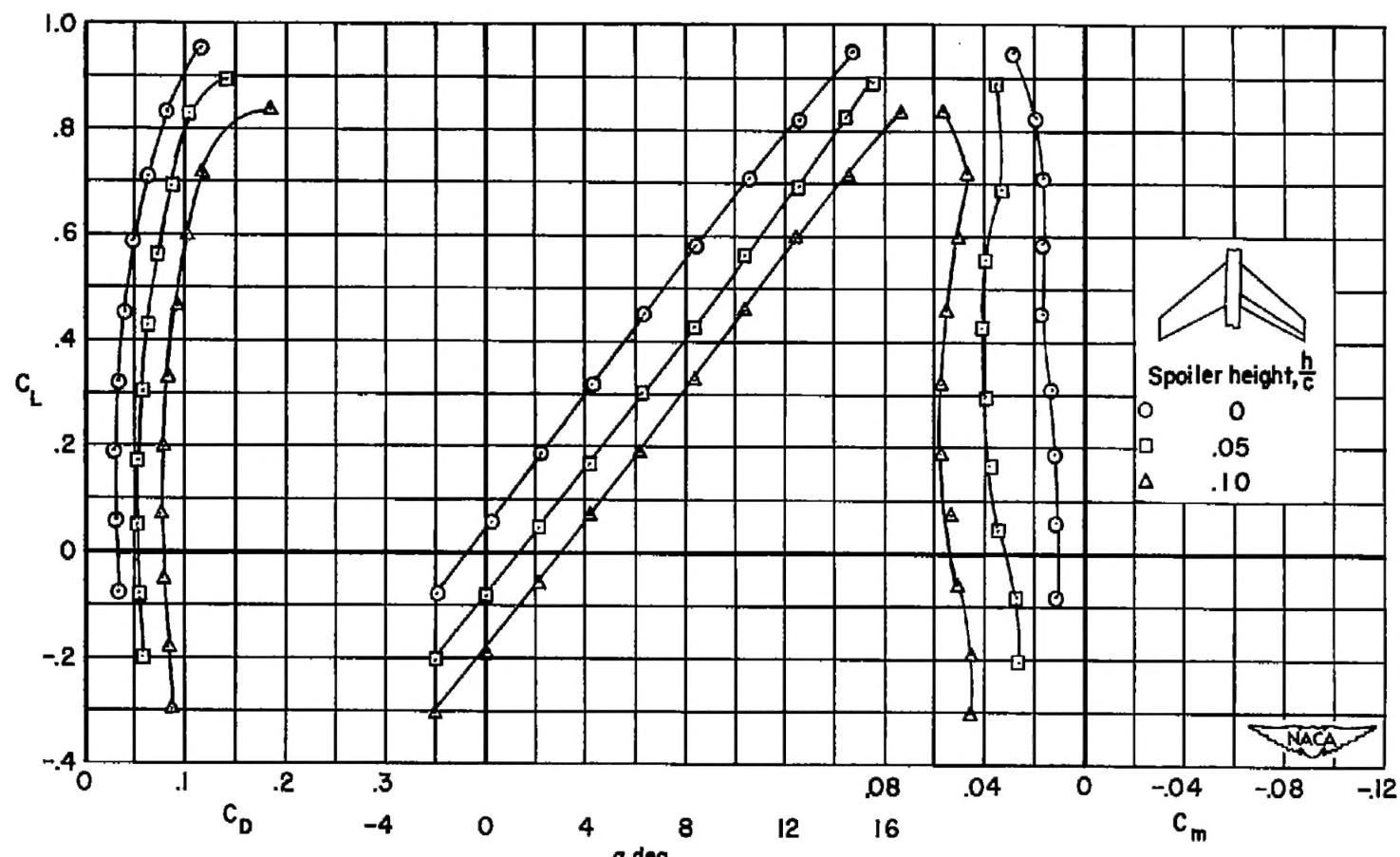
(a)  $C_L$  vs.  $C_D$ ,  $\alpha$ ,  $C_M$ 

Figure 9.- Aerodynamic characteristics of model 4 with horizontal tail removed;  $\frac{x_s}{c} = 0.70$ ;  
 $\eta_1 = 0.10$ ;  $\eta_0 = 1.00$ .

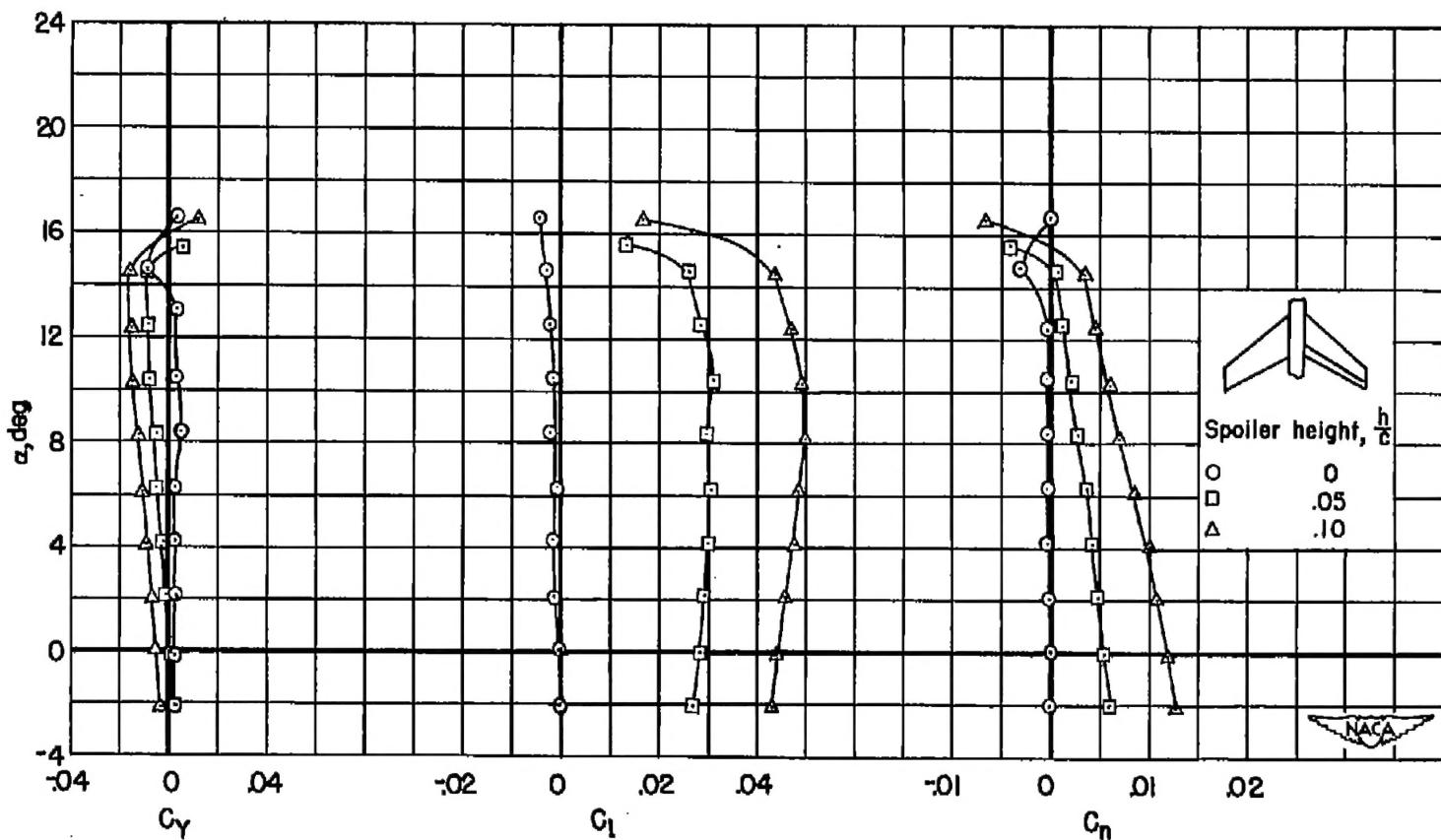
(b)  $\alpha$  vs.  $C_Y$ ,  $C_l$ ,  $C_n$ 

Figure 9.- Concluded.



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